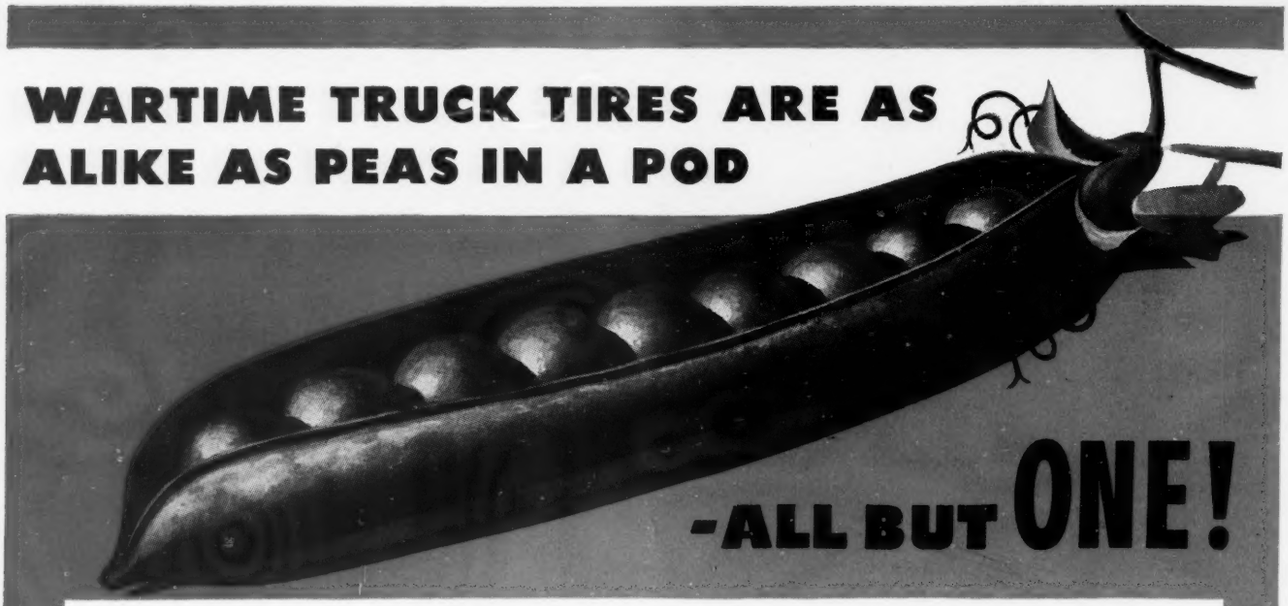
FOOD INDUSTRIES

JULY 1942

"UNITED WE STAND"

Y W[illegible] BONDS
ND [illegible]AMPS
OR [illegible]CTORY

WARTIME TRUCK TIRES ARE AS ALIKE AS PEAS IN A POD



-ALL BUT ONE!

Through its proved Heat-Venting principle, The Wartime SEIBERLING TRUCK TIRE protects against internal heat—and SAVES RUBBER FOR VICTORY

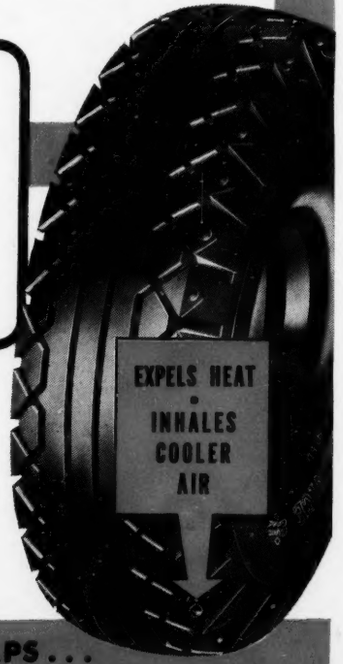
Because America's stockpile of rubber *must* outlast the Japs, the government has standardized specifications for *all* tire manufacturers. That makes *all* wartime truck tires pretty much alike—all but the Seiberling Heat-Vented Truck Tire. To conserve precious rubber, this wartime tire retains its famous Seiberling Heat-Vents. They *expel dangerous internal heat*—the cause of more tire failures than all other factors combined.

And because *all* wartime truck tires contain less crude rubber and more reclaim—*are less resistant to heat*—than those made before Pearl Harbor, the cooling effect of Seiberling Heat-Vents is more important than ever. Use your next ration certificate for the only wartime truck tire that helps conserve rubber by expelling dangerous internal heat.

YOUR TIRES ARE FIGHTING FOR AMERICA...
MAKE THEM LAST!

The truck you use is a vital weapon in winning the war. Without it, and the thousands of other trucks, the all-important job of feeding and arming America would come to a standstill. Keep it rolling toward Victory by doing everything in your power to make your tires last longer.

1. **Drive only when necessary; conserve vehicle and tires.**
2. **Drive under 40 miles an hour; speed burns up rubber.**
3. **Check tires for proper inflation once a week; low pressure may ruin tires and tubes.**
4. **Have your wheels, brakes, tires and tubes examined regularly by a reputable tire service man; his expert recommendations can give you many extra miles.**



V Save Rubber For **VICTORY**

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Heat-Vented

TRUCK TIRES

MAKE YOUR TIRES OUTLAST THE JAPS...

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OUR FLAG

We Americans no longer need anyone to tell us what our Flag means. But many of us need refreshing on Flag etiquette. In showing respect to the Flag, civilians, as well as soldiers, should salute when the Flag is being raised or lowered or when it passes (uncased) in a parade. A man not in uniform salutes by removing his hat with his right hand and placing it over his heart while standing upright with heels together. A woman in civilian attire places her right hand over her heart, while standing upright. When the Star Spangled Banner is played, a civilian stands upright and faces the music, with right hand over heart, except when Flag is being lowered at sunset, on which occasion he faces the Flag and salutes until the last note of the anthem is played.

The Flag should be displayed from sunrise to sunset. It should be displayed on all National and State holidays and on historic and special occasions. The complete Flag Code should be studied by everyone.

FOOD INDUSTRIES

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This Issue

Time to Quit Cussing

Food plant floors are perhaps the most cussed and discussed subject among food factory operators. And probably less constructive thinking is done about them than about most other food industry problems. To be sure, it is not easy to build floors that withstand well the destructive action of fats, oils, acids, alkalis, frequent washing and mechanical wear and tear. But there is a floor for every purpose and a best way to construct every floor. So it might be well for food men to do less cussing and pay more attention to floor technology and engineering. You can start with the article on page 56, by R. Kanegsberg, authority on floors.

Now the Other Problem

Much has been published in FOOD INDUSTRIES recently about the processes of dehydration. And now comes some solid information on the packaging problem. In addition to a practical tell-how article by L. K. Harper, of Sardik, five pages (47 to 51) are devoted to pictures and descriptions of packages being used for dehydrated vegetables, soups and eggs. May we direct your attention in particular to the moisture-vapor proof, greaseproof and light-proof packages for soups and for Lease-Lend shipment of dried eggs.

Apple Jack and the Wars

World War I brought Prohibition. Prohibition gave way to Repeal, and Repeal inspired the building of a lot of apple brandy plants. But the "Jersey lightning" didn't catch the popular fancy as had been expected, and now there are a lot of idle apple jack plants. These plants can easily be converted to the manufacture of pectin and concentrated apple juice, two things of which there is a wartime shortage. How this conversion can be carried out is told on page 44 by B. T. Branham, who spent six years building and operating an apple brandy plant and who has in the past served as production supervisor and chief chemist for E. Pritchard and P. J. Ritter. He is now in technical food control work.

In Case You Missed It

If you were not able to attend the meeting of Institute of Food Technologists in Minneapolis, June 14-17, turn to page 41 and "sit in" on the proceedings. Much was offered at this meeting in the way of discussions of current problems. And the outstanding facts and ideas from the many papers presented have been reported by our editors.

Coming

Information You May Need

There is a possibility that the sugar content of certain jellied products will be reduced. So it will be on the safe side for jelly manufacturers to know the pectin requirements of jellies containing less than the usual 65 percent soluble solids. These requirements will be given in an article by George L. Parker and Marvin W. Goodwin, Delaware Agricultural Experiment Station. To give you a sample: It is known that the amount of ordinary commercial pectin required is increased when the solids content of pectin jellies is decreased. But where low-methoxyl pectins are used, only a slight change in pectin content is required.

Cold Facts About Apples

Apple storage rooms can be refrigerated with ammonia coils, brine pipes or dry-pipe air conditioning units. But experience points to advantages for brine-spray refrigeration. Among the advantages are more rapid cooling, even temperatures, proper and uniform relative humidity and elimination of the defrosting problem. Detailed discussion of modern apple storage technic, and descriptions of three storage plants, will be published soon. The author, G. O. Weddell, York Ice Machinery Corp., has spent 32 years in the air conditioning and refrigeration industry.

It's Either Up or Out

Quality control in the food processing industries is headed sharply upward. AMS continuous inspection is being adopted by a rapidly increasing number of canning plants. And the requirements of government buying for Army, Navy and Lease-Lend follow the AMS pattern. So it would seem that those who want to stay in the swim of competition will have to maintain good quality standards. And as a little help in that direction, FOOD INDUSTRIES will publish brief digests of the various AMS standards. Some appear in this issue, but many more are to come.

Little Things That Count

The more technologists learn about food processes and malprocesses, the clearer becomes the effects of minute quantities of metals which act as catalysts. Off-flavors, rancidity, toughness and other troubles encountered have often been traced to this source. A most enlightening discussion of these little things that count will be given in the August issue by J. A. Dunn, technical director, Diamond Crystal Salt Co.

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FOOD INDUSTRIES
FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor JULY, 1942

Four Jobs for War Food Requirements Committee

WHEN Donald M. Nelson officially announced the creation of the War Food Requirements Committee on June 5, and appointed Secretary of Agriculture, Claude R. Wickard as its chairman, the much needed initial step was taken. It now appears probable that, in so far as human endeavors permit, the food problems of the United Nations and ourselves will be handled aggressively and according to a unified plan. This is as it should be, and it is gratifying to note that the composition of the Committee insures that nearly all the interested factors are included in the planning set-up.

Thus, the State, War and Navy departments; the Board of Economic Warfare; the Lease-Lend Administration; and the Civilian Supply, Industry Operations and Materials divisions of WPB are adequately represented. The only important omissions are the Maritime Commission and War Man Power Commission.

The No. 1 job of the WFRC is, of course, to determine how much food it is necessary to produce *and* process in the United States during the next crop year. This must include all the various types of food needed. It is gratifying to learn that Secretary Wickard has already compiled much data on this score which he has used as the basis for the farm production program.

No such data or estimates appear to have been made on the No. 2 job, the survey of processing facilities in this nation. A move was afoot a year and a half ago to make such a survey, but about February, 1941, the action was, with questionable wisdom, squelched by the then head of Surplus Marketing Administration. The discarded plan called for an evaluation of food resources, processing facilities and prospective needs on these bases: Continued "peace," war in the Atlantic, war in the Pacific, or both of the latter.

The No. 3 task, one that is really inseparable from the second job, is a survey of the needed packaging supplies and an estimate of the packaging materials that can reasonably be expected to be available. The two jobs are inseparable for the following reasons: (*a*) The kind of package that is available determines the type of preservation process that can be used to preserve perishables; and (*b*) the kind of process that is thus determined in turn depends on the existence of the facilities for equipment for carrying it out.

If, for example, the Committee finds that it is imperative to divert additional steel and rubber from food containers to munitions or ship building, then the equivalent amount of perishable foods must be preserved by dehydration, freezing, pickling or smoking. The question then arises: Are there sufficient facilities for processing the requisite volume of foods? This automatically will lead up to the next major problem for the WFRC—the really tough job, the one every food processor will find of vital importance to his future plans for operations.

The No. 4 job, that will be so tough, will be to reach the decision to grant the use of sufficient materials and the building of sufficient facilities to process and preserve the foods that will be found needed. Here is where the real competition for metals, machinery equipment, rubber and other critical materials can be expected to precipitate heated debates. It is here that there is great need for wisdom and technical knowledge of food processing. And it is to be hoped that the committee will be adequately advised. Douglas Townson, head of the Food Branch of WPB and one of the Committee, has had a lifetime in the field, but he will have some formidable opponents in the Army and Navy representatives.

If they reach the best possible compromise between all the conflicting demands for critical materials (there can be no happy solution) in time to permit food to do its part in helping to win the war with maximum efficiency during 1943, the Committee will have done a good job. All will follow their progress with great anxiety. Though further important tasks are foreseeable for WFRC, these can wait for the proposed answer to the No. 4 job before discussing them here.

L V Burton EDITOR

The Talk of the Industry

● FARMERS in Suwanee County, Fla., have started a "Victory Pig" campaign, by choosing the shoat most likely to succeed, naming him "Vic" for victory, and giving him special care and feed. How many of you city slickers know what a shoat is?

● REXFORD GUY TUGWELL, governor of Puerto Rico and one-time executive of a food company, appears to be having his troubles with the food problem of the island under his jurisdiction. Also, it would seem as if he were lacking in resourcefulness if he must come back to the mainland for help. Small wonder he did not stay in the food business.

● SOMEHOW all these experiments with wooden tires and steel-rimmed wooden wheels for motor trucks cause

one to wonder what will happen to concrete pavements should their use become widespread.

● CONSIDER Boston, if the shape of things to come catches your fancy. A personal investigation of the source of interest that drew a large crowd at midnight revealed that it was nothing more than a horse-drawn hack. A forehanded taxi company has put on ten of them and plans to put on more when possible.

● RECENT official predictions about synthetic rubber possibilities certainly live up to the elastic properties of the most sought for material. The only believable information about rubber is that we need a hell of a lot of it. This department is skeptical of the truth or accuracy of optimistic forms of crystal gazing.

● SINCE the release of Earl Browder from the jug the recent action against Harry Bridges has us slightly confused. He ought to be deported because of his predilection for trouble making, if for no other reason. But logic and consistency fall down when the two cases are compared.

● WONDER if in German cities of the Ruhr Valley and the northwest the priority ratings for repair parts is any higher than A-10 since the bombings have begun in earnest?

● AN EXCELLENT picture of the meaning of a billion dollars may be gained by supposing that a firm had a cash capital of $1,000,000,000 in the year 1. By bad management it lost money steadily at $1,000 per day. In what year would it go broke? No, not by 1942. It would still go on losing money at one grand per day for about 796 years longer before its original billion would be exhausted. A billion dollars is a very respectable sum.

● SOME unidentified person sent us a reprint of a piece from the *Detroit Free Press* of May 3 in which the following appears:

"Last week 2,000,000 barrels of gasoline were destroyed in Chicago. Special permission was granted to do this because Chicago did not have storage facilities."

A check up with Standard Oil Co. of Indiana, Pure Oil Co. and Universal Oil Products Co. reveals that there was no foundation for the statement. A fire of this size in Chicago would have been as much news as the bombing of Cologne. Apparently this fiction has about as much substance as the yarn about the gypsy who foretold the dead man in the auto within the hour, or the more ancient classic about the grinning dead man in the subway, or the old lady hitch hiker who wore pants and had a wash basket full of revolvers. It always happened to a "friend of mine," never to the teller. And the gasoline destruction took place somewhere else. About this time the Chicago papers carried stories of gasoline destruction off Miami.

Sounds like propaganda originating from the enemy.

● TRAVELING salesmen who have not made their territory by train in the last twenty years deserve sympathy. From now on when they are in a small town they are stuck until the next train—usually next day. Well, the third-rate hotels will need something more than a convenient parking lot to attract the boys now.

● "THANATOCHEMISTRY" is a new word, invented by Prof. Otto Rahn, Dairy Department, Cornell University. It refers to the chemistry of death, even as biochemistry refers to the chemistry of life. Come to think about it, thanatochemistry is more in the province of food technology than biochemistry.

● A FRIEND on the West Coast reports another and unanticipated horror of war. It seems that he is losing considerable sleep during the blackouts because a group of college students living nearby are inspired by a blackout to yell continuously until the all-clear signal is given. After that they stage a real celebration. Actual bombing could not make sleep more difficult.

● EASTER LILLIES have bulbs that are said, by USDA investigators, to be rich in a type of starch that resembles the waxy tropical starches such as cassava. Wouldn't this be something

to behold if these were grown by the hundreds of thousands of acres needed to replace Java's production?

Wheat Scandal Coming

Good old Yankee ingenuity is needed to develop suitable foolproof and insect-proof wheat storage bins or else we shall see an enormous quantity of the bread grain wasted and lost this year. Steel can't be used for sheet-iron bins, or for reinforcing rods for concrete.

Unless the problem is solved the wheat loses may become an economic scandal.

What's the solution? Plywood bins?

You Have To Make Things Last

More and more Limitations Orders are being placed on equipment, instruments and supplies of many sorts. L-123, issued on May 27, is a case in point. It covers general industrial equipment such as conveyors, power-transmission equipment, pumps, blowers, motors above 1 hp., controllers and heat exchangers. Hereafter, to get any such new equipment the orders must be "approved" by WPB, which means A-9 or higher.

All this means that it is imperative for food processors to take the best of care of every piece of equipment.

Perfect maintenance is essential. Lubricating oils are not yet rationed. Use plenty but be sure they are of the right specifications.

Employees, especially the new ones, must be properly instructed in proper care of the facilities with which they work. Even the man who pushes a truck must realize the need of care, gentle handling and avoidance of bumps and blundering collisions with machines, walls and corners.

There never was a time like this war when it could more truthfully be said, "A penny saved is a penny earned." Under today's conditions, a piece of equipment saved often literally means a job saved.

Food Standards Holiday?

Unofficial advices from Washington reveal a growing conviction that there should be no additional hearings on food standards under the new Food, Drug and Cosmetic Law until the war is over. Those standards now in the process of promulgation will be cleared up, and presumably there will be a recess until some future date. Possibly the hotel situation in Washington may have been the motivating factor, yet all will favor the postponement save possibly those whose label printing may be interfered with under today's colored ink restrictions.

Frozen and Dried Foods Forgotten by OPA

When the Maximum Price Regulations went into effect there was no special provision for seasonally produced foods like canned foods, frozen foods or dehydrated foods. Canners, being bigger and better organized than most food industries, forced an exemption on canned vegetables on the ground that seasonal agricultural raw material costs in 1942 are much higher (with USDA blessing) than in 1941. So a "formula" has been developed that helps out some, but it applied only to *canned* vegetables. The U. S. Department of Agriculture will support the market for many of the more important items by purchasing at 92 percent of the ceiling price under the new formula.

Whether the government will resell to the wholesale trade at the latter's lower ceiling and take the loss is not certain. The USDA and OPA failed to announce when the price regulations were issued what disposition would be made of the canned vegetables acquired under the support program.

All very complicated and unrealistic. Also, it has left freezers and dehydraters of vegetables out in the cold. In general the economics of the canners is not materially different from that of freezers and dehydraters, the latter still but a small factor in the consumer market. Freezers, however, are facing much grief until they too are granted comparable relief.

OPA action should be more comprehensive. Furthermore, if the War Food Requirements Committee had been functioning as it should have been, all this needless turmoil could have been anticipated and forestalled.

How to Convert A Food Plant

No more perplexing problem has faced many food processors in many years than how to keep a nonessential food business alive either by conversion to the production of war goods or to an essential food industry.

Hors d'Oeuvres

• A Washington dairy has published a poster which reads: "We have been caught in the squeeze between two government agencies. The Federal Milk Marketing Order has raised our costs on cream above our present selling price and the OPA has prohibited a proportionate increase in the retail price. As a result we lose money on every bottle of cream sold. Until this situation is adjusted, we will not always be able to supply the full demands of our customers for cream. We hope you will understand and appreciate that we find ourselves caught in a situation beyond our control."—The customers may understand, but will Mr. Henderson?

• *Food from 42,000 acres of land is required to feed the builders of one 35,000 ton battleship. Then two little guys in a bomber fly over and it takes food from 42,000 acres of land to feed the builders of another battleship.*

• A Brooklyn woman stocked her basement with canned food of all kinds. Then a water pipe broke and flooded the place, soaking all the labels off the cans. Now the lady hasn't the slightest idea what she will serve for dinner until she opens the cans. Which is a nice solution to the housewife's perennial headache as to "what shall I feed the old goat tonight?"

• *High molecular alkydimethylbenzylammonium is a new germicide. For sterilizing dairy equipment it is diluted 1 to 5,000, which would just about make it pronounceable.*

• Most business men take their troubles, seriously, but one in Sebring, Fla., has a different idea. On the door of a bakery there appeared this sign: "Closed for one week to conserve sugar and also to catch up on our fishing."

• *Cockchafer meal is being used for poultry food in Switzerland. The nutritive value of the meal is very high. Wait till Adolf hears about it.*

• To save shipping space Australia exports dried milk in the form of bricks.—Edible Irish confetti. What next?

• *"Morale is a lot of little things," says an ad by Brewing Industry Foundation. And, of course, a cool refreshing glass of beer is one of the little things. Well, here's morale in your eye!*

• In a pint of beer there is approximately as many calories as in a pint of pea soup. Which brings the nutrition problem to a head.

• *The Fishery Council reports a "multitude of mackerel ready for good eating." Yet, the mackerel is a fickle fish, the annual catch varying from as much as 120,000,000 lb. to as little as 20,000,000 lb. in two years.*

• "In summer coffee stimulates; in winter it warms up. It urges for action and cheers up those who are tired. At sea it comforts the long watches; in the air it makes for lightning reactions; on land, it keeps you on the alert. It gives energy for physical exertion and keeps a clear mind in mental strain. Get more out of life with coffee!" —And they tell us all this just when there's about to be a shortage of coffee.

F.K.L.

How to do it is not so difficult as *what* to do.

Analysis of many cases reveals one outstanding fact above all others: the principal problem is that of converting the management. This is not said in derision. It is merely a fact. If management knows only one specialized form of production, there is scant hope of a quick conversion to something else. For the first step involves the ability of the management to learn how to run an unfamiliar business. And unless the "tops" know how to run a new enterprise, it is not likely either to succeed or to get the needed equipment and supplies. The WPB is becoming more critical of the ability of management when it comes to allocating scarce materials and equipment.

A new skill, a new outlook or the addition to the management staff of some one who possesses the requisite knowledge is the first step. After this management-conversion has been achieved, then it is possible to decide *what* can be done. The next stage after that is *how* to convert—how to set up the plant, how to get any missing equipment or improvise it.

Even after all this is accomplished the rest is not easy, for although the government is in the market for unlimited amounts of thousands of items, management must go after the business. It still takes a tremendous amount of perseverance and hard selling.

But unless management has achieved the indispensable intellectual conversion, it is futile to hope for any aid from outside.

Trucking Service Stopped by ODT

Office of Defense Transportation regulations are playing havoc with many private fleets of motor trucks in the food industry, especially the recent order, ODT No. 6, limiting deliveries to a 15-mile radius unless the return load amounts to 75 percent of the outgoing load. Most food concerns do not have incoming loads of their own goods in any such quantities, and very few of them are certified as contract or common carriers under the Motor Carrier Act. Hence they cannot legally accept outside business even though they have no return loads of their own.

Plainly, the situation calls for a common-sense revision, despite the great need for rubber conservation. Food distribution must go on, war or no war.

Hypothetical Prices

OPA price ceilings on some canned foods appear to have been made without much thought to the effect of WPB order M-81, which prohibits production of many items normally considered staples. Still it's nice for the public to know that if they could continue to get the disappearing items the price would be under a ceiling.

Keep Up Your Fuel Supply

Advice to keep coal piles big and oil tanks full is something to be considered seriously by every management. For, despite the railroad's boasts that they can handle all freight, there are signs that fuel may be delayed in shipment. For further substantiation of the precaution, keep in mind that Britain had to recall coal miners from the army and from retirement. Our own experience seems to duplicate Britain's, with a one-year lag.

Furthermore, repeated sinkings of oil tankers along both coasts, especially the Atlantic, can only mean reduced supplies of oil, including fuel oil, and bigger loads for the railroads to compensate for diminished coastwise shipping.

Prepare for Crash Shutdowns

Bombs may fall on United States coastal cities almost any time now. Don't be overoptimistic. Get ready. Do it now!

There is no safety to be derived by being away from a military target if, perchance, the enemy bomber is attacked and jettisons its bomb load in an effort to escape. Those bombs might land on a nonmilitary target such as your plant. Never forget that, up to now, no carrier-based bomber has been built that can make a landing with a cargo of live bombs without blowing up. So bombs are never brought home. Hence you can expect that enemy bombs will hit somewhere.

Chances of a food plant being purposely bombed are less likely than something of a more military nature. But when air raids come ALL your help must be shepherded into shelters. You won't be allowed to leave anybody outside if the enemy is overhead.

What will happen in your plant if everybody suddenly clears out with everything going full blast? This question needs your earnest attention, whether or not the enemy is ever overhead and whether or not the bombs ever fall.

It calls for what the British describe as a "crash shutdown." It's comparable to a crash dive of a submarine, or a crash landing of an airplane. Everybody has to know what to do in great haste.

Processing plants, be they food or chemical processing plants, offer peculiar problems, for neglect to take suitable precautions may mean explosions, fires, loss of valuable raw material or destruction of valuable equipment when everybody runs for shelter without doing all the things that will prevent such loss from purely internal forces.

What are you planning to do about your boilers? Will you draw fires, shut off fuel, allow the steam to blow from the safety valves if all uses are suddenly stopped. Will the feedwater pumps keep going with nobody there?

What about goods in process? Suppose somebody sounds the siren, pulls the main electric switches and then runs for shelter, what would happen to your equipment and the product? Would bread in an oven be burned to charcoal? Would the oven conveyors be heated red hot and pull apart when restarted? Would automatic temperature controls cease to function with the main switch pulled?

How about big batches of tomato pulp or catchup during a crash shutdown? Do they keep on boiling and burn to a crisp, thereby putting the plant out of business for some time.

How about meat packing plants, sugar refineries, dairies, breweries, coffee roasters and every sort of food processing establishment that might be in an air raid area? Careful plans must be made for crash shutdowns in each and every case.

Also there are many other matters to be foreseen in case actual raids destroy: (1) Water mains, (2) sewers, (3) gas mains, (4) power lines. What would you do to resume operations if any or all of these utilities were destroyed?

It's time to prepare for the worst.

WARTIME FOOD PROBLEMS DISCUSSED BY IFT

What must be done by food processors and technologists to assure supply of food for United Nations is theme of "Conserve for Victory" convention. Packaging, dehydration, equipment and substitute materials get attention

RALLYING to the slogan "Conserve for Victory," almost 500 members of the Institute of Food Technologists met in Minneapolis, June 14-17, to discuss the part of the food technologist in the war effort and to exchange information useful in furthering the task of supplying ample food to the United Nations.

Col. Paul P. Logan, Chief Subsistence Officer, U. S. Quartermaster Corps, in speaking of the rôle of food technology in war time, pointed out the unusual position of the United States as to foods—in the past year we produced more foodstuffs than ever before, and prospects for this year are even better. But as the needs of the Allies increase, supplies of the protective foods and protein foods must be increased. In the face of this need, the available manpower is decreasing and equipment and supplies are becoming scarce.

So far, cans are necessary for shipping foods to our allies and our armed forces. Because of shortages of tin and steel, other methods of food preservation than canning must be developed as far as possible. Also, other metals for machinery are scarce, yet wear and tear on processing equipment is greater than ever before. Other problems affecting the food technologist and demanding his utmost effort and ingenuity to solve are the shortages of rubber and of transportation facilities. Shortage of tires is going to throw an increasing load on the railroads and change shipping habits. Scarcity of vessels will severely cut into importations of foreign food materials and cause changes in food formulas, even the abandonment of certain familiar and popular products. Also the food technologist must aid in the efficient use of every available ship's ton.

Definite contributions that Col. Logan asked the food technologists to make follow:

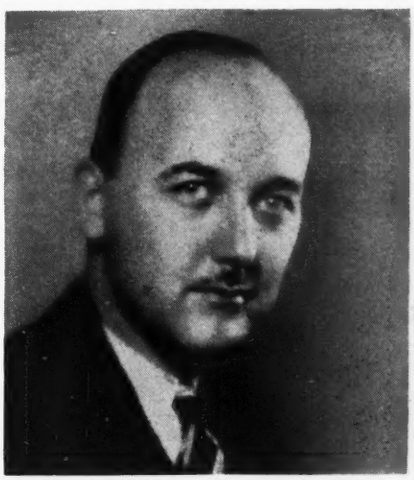
1. Make practical plans to increase supplies of protein foods.
2. Be prepared for adjustments in the labor supply as these become necessary.
3. Produce substitutes for imported foodstuffs no longer available.
4. Extend preservation by freezing and dehydration and provide for the packaging of these materials as a means of solving the problems of material shortages.
5. Produce condensed foods, such as canned foods, in order to save weight or space.
6. Eliminate tin and steel as far as possible without sacrificing adequate protection.
7. Fabricate such new machinery as is essential from nonrestricted materials.
8. Take all possible measures to prevent loss or waste of food materials or processed foods.
9. Provide proper storage for foods to eliminate waste.

R. C. Newton, vice-president of Swift & Co., traced the development of food technology, stressing the advances made in recent years through the application of science to food processing and preservation. Four angles of interest to the food technologist were discussed—supply, palatability, sanitation and nutritive value. The first three of these have received the most attention until recently. Now the greatest emphasis is on better preservation of nutritive value. This has been true for some time among food technologists and is now coming to be demanded by the housewife as well.

Following this paper, E. H. Harvey, director of research, Anheuser-Busch, Inc., briefly reviewed the supply situation with respect to foodstuffs. He pointed out that shortages lead to restrictions and stated that "priorities are the mother of inventions." Food technologists have a real job ahead in seeking substitutes for scarce materials that will permit adequate production and protection of food for United States civilians and armed forces and for our allies.

R. S. McBride, consulting engineer, Washington, D. C., discussed alternate food materials for wartime food processing. He stated that civilian consumers should curtail their purchases of canned vegetables and fruits, pork, animal fats and sugar. The sugar situation will force changes in the formulas of food products, and the increasing use of alternate sweeteners will continue until they, too, become scarce. Increased use of corn sweeteners, for example, will result first in changes in texture, then in flavor, finally in the melting point, which will result in changes in cabinet temperatures. It is evident that food manufacturers must make sacrifices and that even some of the palatability of their products may be lost, but nutritive value should not suffer. In any case, the food processor must plan to get the maximum business for his enterprise with materials that remain available.

Two speakers—George Chapman, senior industrial specialist, Food, Drug and Allied Machinery Section, WPB, and George W. Putnam, vice-president,



E. J. Cameron was elected vice-president of IFT. He is research director of National Canners Association.

The new president of the Institute of Food Technologists, Roy C. Newton, vice-president of Swift & Co.

Three well-known food technologists in line at the registration desk. They are, left to right, President L. V. Burton, Past President S. C. Prescott and Medalist W. V. Cruess.

Local arrangements committee clears up last-minute details. From left to right are F. A. Collatz, H. Macy, C. B. Ferrari, R. C. Sherwood, Mrs. Catherine Clark and Mrs. Evelyn Anderson.

Creamery Package Manufacturing Co. —discussed the matter of material scarcity, priorities and their effect on the availability of equipment for the food industries. In general, the conclusion reached from the remarks of these speakers was that, for food processors, only essential replacements are available and no expansion is possible except upon highest priorities issued for projects that the WPB specifically desires. Even then, little or no scarce metals can be had for such work. But, when there is real need for the development, the food machinery branch will help when it is evident that the project will take less critical material than any other method. Limited supplies of material must be used where they will do the most good, for waste under present conditions is treason, and nothing will be produced not necessary to war or essential civilian needs.

In this matter of shortages, C. H. Hills, of the Eastern Regional Research Laboratory, USDA, described a series of low-sugar jellying pectinates that have been developed in the laboratory. If accepted, these promise the production of fruit jellies of good flavor and strength with much less sugar, and they also can be used for jellying such products as tomato aspic.

Dehydration Arouses Interest

The best attended session of the convention dealt with the subject of dehydration, with papers by E. M. Chace, chairman, USDA Committee on Dehydration; M. B. Davis and C. C. Strachan, Canadian Department of Agriculture, Ottawa; W. V. Cruess and M. A. Joslyn, University of California; B. L. Oser, Food Research Laboratories, Inc., Long Island City, N. Y.; and S. C. Prescott, past-president of IFT.

Dr. A. A. Oser opened this session with a brief review of the chemical and physical methods available for vitamin control in dehydrated foods, both in the raw materials and the finished products

IFT council members convene for an evening session—it was purely business. Left to right are: G. V. Hallman, B. E. Proctor, D. K. Tressler, Ellery Harvey, G. J. Hucker, W. V. Cruess, M. E. Parker, R. A. Dutcher, L. W. Haas, S. C. Prescott, C. N. Frey, C. H. Bailey and L. V. Burton.

Many things act to reduce the vitamin content of foodstuffs before, during and after dehydration, including heat, oxygen, light, oxidizing enzymes, pH, time and moisture. The cause of vitamin losses should be determined, so that these losses can be avoided.

Dr. A. A. Chace reported on the work of the committee, from which he drew the following conclusion:

1. Dehydraters should be located in truck crop areas so as to get supplies of raw materials by means of short hauls that permit drying quickly after harvesting. This should give the dehydrated product an advantage over ordinary market fresh vegetables.

2. Thorough washing and blanching, speedily done, is essential, but when this is impossible, hold the product in a 1 to 2 percent salt solution.

3. Steam blanching is favored, as it gives better quality products. Such blanching can be done in a cabinet dryer without transfer, but in such cases the trays must not be overloaded.

4. In dehydrating, as high a temperature and air velocity as can be used without scorching is recommended.

5. Not over 5 percent of moisture should be present in the dehydrated product.

Losses in vitamins should be avoided by rapid handling, safeguarding against exposure to light and other appropriate methods. But it must be remembered that fresh vegetables vary greatly in vitamin content, so that it is necessary to test the fresh product as well as the dehydrated product. Tests of flavor and quality retention after drying show serious loss in palatability after 16 weeks' storage in almost all cases. The best products were those dried to between 3 and 4 percent moisture, while higher moisture content gave more rapid deterioration.

Enzyme reactions in dehydration were described by Cruess and Joslyn, who discussed a series of tests that can be made to indicate the effectiveness

of blanching in inactivating catalase, oxidase and peroxidase. Changes ascribed to enzyme activity in dehydrated products include darkening or browning, toughening, hay flavors, off odors and losses in vitamins.

Canadian results, as reported by Davis and Strachan, closely checked those of Chace, Cruess and Joslyn.

This session closed with an account of the development of dehydrated foods during and since the first World War, given by S. C. Prescott, who has been associated with this industry since its inception.

What's New In Packages

Packages for dehydrated and frozen foods and the influence of war on packaging in tin, paper, glass and cellophane were the subjects of another session. Perhaps the highest interest was the paper by Roger Lueck, Director of Research, American Can Co. He recounted the restriction placed on tin and showed samples of the various electrolytic tin coatings and chemical treatments developed to meet the emergency. According to the speaker, the total supply of tin available in the United States for the next five years will be 229,700 tons. Allowing for other necessary uses, this will allow 17,000 tons per year for cans. But already the can industry has a program that will reduce their annual needs to about 8,400 tons.

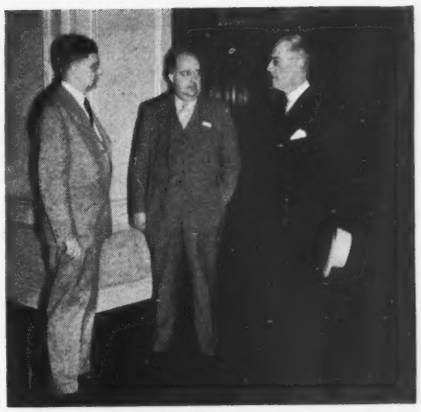
A. F. Wendler of E. I. du Pont de Nemours, showed samples of many packages using cellophane, developed as substitutes for metal and other scarce packaging materials. Among these many packages were some that saved as much as 75 percent of former package shipping weight while doing a satisfactory job of preserving the product. In addition, cellophane is now being used in some packages to prolong the shelf life of products and thus reduce food waste.

Other features of this packaging session included interesting moving pictures of operating canning lines converted from tin to glass. These were shown by H. A. Barnby, Owens-Illinois Glass Co. M. T. Rogers, Dewey & Almy Chemical Co., briefly reviewed the new packages and packaging materials brought out by the war, and E. A. Throckmorton, Container Corp. of America, told how the war has accelerated the normal tendency of paper to replace other forms of packaging materials.

Officers elected for 1943 include: president, R. C. Newton, vice-president, Swift & Co.; vice-president, E. J. Cameron, Research Director, National Canners Association; secretary-treasurer, Geo. J. Hucker, New York State Agricultural Experiment Station. Councillors-at-large are S. C. Prescott, R. S. Hollingshead, L. W. Waters, C. O. Ball and G. V. Hallman.

Luncheon sessions discussed industrial sabotage and labor relations. And round table discussions were held on the conversion of food plants to war work and on educational requirements for college training of food technologists.

At the annual banquet, the Nicolas Appert Medal of the Chicago section of the IFT was awarded to W. V. Cruess, University of California, for outstanding work in food technology.



Three food technologists from the East discuss a few problems before the sessions begin. R. S. McBride, Washington, D. C. (left); G. R. Rettew, West Chester, Pa.; and George M. Chapman (WPB), Washington, D. C.

Members of the ladies' committee get together on the first day of registration. Left to right, Mrs. F. A. Collatz, Mrs. C. H. Bailey and Mrs. H. Macy.

Four early arrivals at the IFT convention in Minneapolis. Left to right, Charles G. Ferrari, Fred C. Blank, R. C. Sherwood and Charles Mongere.

G. Victor Hallman (right) chairman of the Chicago section of IFT, presents the Nicolas Appert Award Medal to W. V. Cruess for outstanding work as a food technologist.

WHY NOT CONVERT THE APPLE JACK PLANTS?

By B. T. BRANHAM
Chemist, Old Virginia Packing Co., Front Royal, Va.

Supplies of both pectin and concentrated apple juice are short, and these ingredients are needed by food manufacturers. At the same time there are many idle apple brandy plants which can be utilized to make pectin and apple juice concentrate. Here's how it can be done

WARTIME conditions have created a shortage of concentrated apple juice and pectin, and they also have thrown many apple brandy plants into disuse. So two problems can be solved at once by making pectin and boiled cider in the idle brandy plants.

Both the concentrated apple juice and boiled pectin are used in large volume not only in the preserving industry but also in making confections and ice cream. Pectin is on the priority list not so much because of its increasing industrial demand as because of the great demand for it as a war material in the treatment of burns and for other medicinal purposes.

There are apple brandy distilleries which have entirely, or to a great extent, ceased operation, and these could be made more profitable to their owners and more useful to the nation as food plants. Most of these idle plants are located in the apple growing sections, and they are not equipped with the proper type of cookers, coolers, stills and other equipment for efficient use in the production of grain alcohol. Besides, fruit alcohol produced from apples is too costly, as it takes about 5 bu. of apples to make 1 gal. of alcohol. It would, therefore, be advantageous to use these plants and the available supply of culled apples to produce boiled cider and pectin.

The buildings, the fruit, the men and the market are waiting for someone with the courage, knowledge and the finances to take hold. Right here in this agricultural section of Virginia there is an idle Bourbon whiskey distillery and several idle or partially idle brandy plants. The Bourbon plant has a capacity for producing several thousand gallons of whiskey daily, and with the utilization of surplus distilling and rectifying equipment from the brandy distillery it could readily be equipped to make 190-proof industrial alcohol. And the brandy plants could all, or all but one, be converted to make boiled cider and liquid pectin, leaving one brandy distillery to manufacture with ease all of the demand for this product south of New Jersey.

It would appear that to utilize the existing plants for war production, some one in Washington should have a survey made in each industry and section to determine the practicability of converting nonessential plants to the production of needed foods. With knowledge and authority, it would not be too difficult to arrange to buy or lease the nonessential plants or equipment and to utilize them for war purposes. In the case of pectin and apple juice concentrate, the time to act is in time to arrange for the delivery of cull apples and in time to "retool" for the needed products.

Many Idle Apple Jack Plants

The manufacture of apple brandy was never standardized in either formula or equipment, or even in name. After Prohibition, many of us thought that "apple jack," being more easily "aged," would become a very popular distilled liquor. For this reason many distilleries were set up. This equipment is now largely idle and of such a nature that it can be readily used for making cider and pectin.

In all sections except Virginia, apple cider was made by the brandy distillers as the first step in making brandy. In two of the Virginia brandy distilleries the apples were run through a hammer mill and fermented as crushed apples, without preliminary pressing into cider. But with these exceptions all apple jack distilleries of any size had equipment to make cider. All that would be required to make commercial boiled cider is for these distilleries to be equipped to concentrate the apple cider to 68 percent soluble solids or to approximately one-fifth of the original volume of the product.

As most apple brandy distilleries were equipped with a pot still, the conversion of the still to an evaporator would be very simple. By pulling a vacuum through the present condenser, a satisfactory vacuum pan could be made from most of the pot stills used in the industry. All distilleries are equipped to fill and store wooden barrels, and most have a supply of these used containers on hand. Filling these barrels with concentrated apple juice or pectin and storing the filled barrels in the rack warehouses could be done with practically no changes or additional equipment, as can the concentrating of the cider. In plants where the pot still cannot be suitably converted to a vacuum pan, the condensers or coils in the yeast tubs probably could be used to concentrate the cider to the proper consistency for storage in barrels.

As far as pectin is concerned, the use, sale and distribution—as well as the manufacture—is much more restricted to large producers because of patents and marketing facilities. Its manufacture for use, however, is simple. But as with all food products, constant supervision is necessary to produce a quality product.

There are several ways in which the apple pomace now so universally wasted in small plants could be made available for pectin manufacture. One way is to dry the pomace in "slop" or pomace driers or other available equipment and sell it to pectin manufacturers or directly to the preserving industry. Or, if no drier is available or economically feasible, the pomace from the cider could be readily extracted and pressed in the same press used for cider. The pomace accumulated from a day's run of cider could be boiled with the proper amount of water and at the correct pH in a pressure cooker, if available, or in open tanks. The pressing of the cooked pomace is done in the cider press. The extracted pectin solution could be readily "destarched," filtered or decanted in the many wooden tanks available at apple brandy distilleries. The pectin extract made from the pomace could be concentrated in the

equipment employed for evaporating the cider after the day's run of cider is completed.

In converting the brandy still into evaporating units, much depends upon the size and type of equipment used in the distillery. Unlike whiskey, apple brandy equipment was never standardized. Pot stills, three-chamber rye stills and column stills were all used. As for condensers, both the coil type and tubular ones were used. In evaporating cider to "concentrate," either open or closed units can be employed. Vacuum pans are fine, and a combination of partial condensation in open coil-equipped tanks or "boxes" and final condensing under a vacuum is good engineering practice. Given the usual distilling equipment, by using the pot still or doubling still as a pan and the condensers or heating coils for partial evaporation, an efficient evaporating system can be rigged up without much, if any, additional equipment.

Brandy plants have tank capacity to store not only the cider produced in a day, or in two days, but also the capacity to store cider for the four days to a month necessary to ferment it (the time difference is due to the temperature and use of added yeast and type of yeast used). In the manufacture of boiled cider and concentrated pectin, this extra tank capacity will be useful for the storage of the cider and for cooking the pomace before it is pressed and before the pectin extract is manufactured.

Before the extract is concentrated it must be clarified, and it is necessary for jelly making to remove the starch. Tanks are needed for cooling, for the enzyme treatment which converts the

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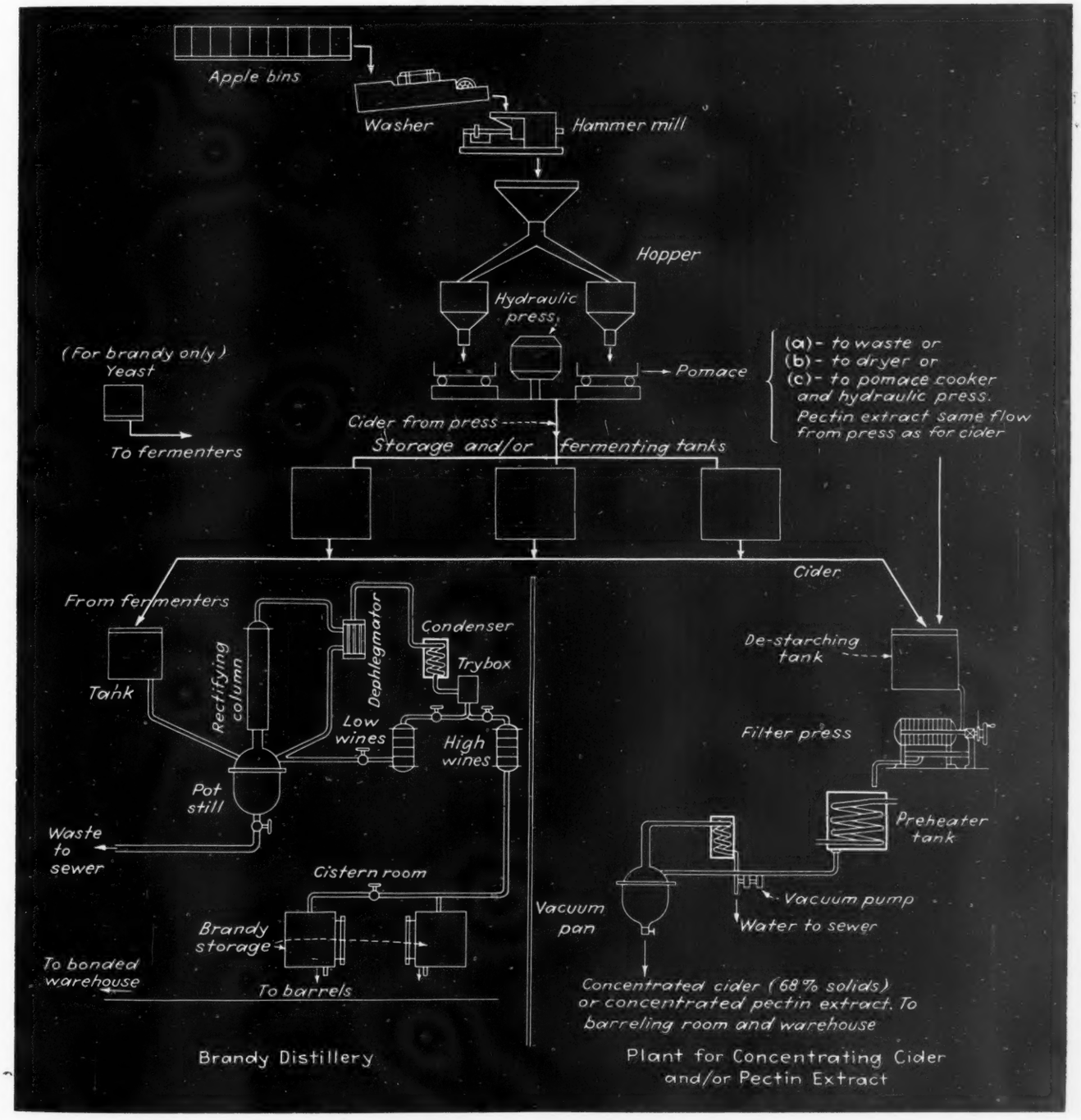

Flow diagrams showing the process for making apple brandy and the same process as converted to the manufacture of concentrated apple juice and pectin.

DEHYDRATION

Dehydrating Meat • Packages Used for Dried Foods • Pointers on Packaging Dried Foods

Method Developed For Dehydrating Meat

Concerted efforts by industry and government have produced satisfactory technic. The meat is cooked and then reduced to low moisture content. Several types of commercial driers may be used. Further production studies and packaging tests are being made

ANNOUNCEMENT on June 4 by the American Meat Institute that processes for dehydrating meat have been developed, reveals, in a limited way, a phase of food dehydration for wartime uses that has been going on for several months.

With the beginning of the War of the Atlantic Ocean, German submarines and bombers versus British shipping, English research workers inquired early in 1941 as to the possibility of cutting down shipping-space requirements for animal proteins by substituting dehydrated meats for the fresh, cured and canned meats then being shipped. A method tried out for the Richard E. Byrd Antarctic Expedition by Armour & Co. was pulled out of its 13-year-old pigeonhole, dusted off and reviewed in the light of 1941 technology and equipment available under the then existing conditions.

In the absence of pressing emergency needs, the revived study of meat dehydration progressed on a research study basis until word came from Russia that meats in concentrated state might have to be flown in by airplane and that considerable tonnage might be needed. Newspaper accounts have had this tonnage ranging from 1,000 to 25,000 tons of dehydrated meat.

On the basis of studies made by the American Meat Institute, U. S. Department of Agriculture and several meat packing companies, concerted effort was put on the project to the end that tangible results have been obtained in the past several weeks. From this effort has come a finished product, either beef or pork, which is approximately 55 percent protein, 30 percent fat, less than 10 percent moisture and high in the B vitamins, iron, phosphorus and copper. It reconstitutes easily through addition of water and is highly suitable for the making of meat loaves, stews, soups, patties and the like in which ground meat might be used. As emergency ration, it may be eaten in its dehydrated state. Experimental tasting samples show it to be appetizing, easily masticated, and readily digested.

While attempts have been made to dehydrate masses of raw meat and to cure the meat prior to dehydration in an effort to retain the fresh meat pigment, as much as possible, those attempts have not given a satisfactory final product thus far. The processes referred to in the American Meat Institute announcement involve grinding and cooking of the meats preparatory to drying.

Cooking and drying procedures followed depend upon the type of equipment used and upon the character of the meat being dried. In those instances where the precooking results in a broth, the broth is reunited with the ground meat during the drying operation to be uniformly distributed through the final product. In the fully enclosed type of cooker-dryer, the ground meat is subjected to a cooking heat by indirect application of steam followed by drying temperatures under reduced pressure until the desired final moisture content is reached. Both the cooking and the drying operations are carried out at temperatures considerably below the boiling point of water; also at atmospheric and slightly above or less-than-atmospheric pressures.

Units embodying systems of drying which have possibilities of immediate commercial use are:

1. Tunnel air dryers which operate at atmospheric pressures and in which the meat is moved continuously through the drying zones on a perforated conveyor. The drying air moves both countercurrent to the path of conveyor travel and upward through the belt perforations.

2. Roller-type dryers commonly used for drying milk solids, which may or may not operate under reduced pressure. Heat is internally applied to the rolls by steam to give the heated surface upon which the ground meat forms a thin film to be scraped off by a knife edge at the predetermined points of rotation of the drying roll.

3. Rotating-drum cooker-dryer into which heated air is discharged through louvre-like vents to give a sweeping-out action to the vapor as the heated air is forced into the drum and through the tumbling mass of ground meat.

4. Stationary steam-jacketed cooker-dryer equipped with a revolving agitator commonly used for vacuum dry-rendering of lard and other animal fats. The ground meat is charged through a valved opening into the unit where it is immediately subjected to a cooking heat which is maintained during the drying period as the ground meat is continuously agitated and moved by the helical agitator towards the valved discharge opening.

Experimental units which give excellent sample products and which have not yet been developed to commercial importance are:

1. Vacuum cooker-dryer which operates under superheated steam conditions.

2. Vacuum freezer which depends upon low-temperature drying.

All of the satisfactorily dehydrated meats have a grey to grey-brown color characteristic of cold, ground-up cooked meats as well as a cold cooked-meat odor. Samples from approved procedures subjected to two-months keeping tests under atmospheric and room conditions show no organoleptic evidences of rancidity. Packaging tests are being continued as well as are further production studies.

Expectation is that the governmental purchasing agencies will soon ask for bids on quantities of dehydrated meats for Lease-Lend, armed forces' use abroad, and emergency uses on both land and sea.

How Dehydrated Foods Are Being Packaged

If you have a dehydrated food packaging problem, take a look at what others in the industry are doing, as shown by the packages illustrated and described here. You may also be interested in what the government agencies require of packages for dried foods, which is discussed in this article

NECESSITY for conserving vital shipping space and weight, together with the acute shortage in metal containers, has started the food industries on a dehydration program the magnitude of which was not even dreamed of a year ago. Both food processors and government agencies are working out dehydration processes and technics under forced draft, and both are sitting up nights to solve the difficult problems of proper packaging for dried foods, as are the manufacturers of packaging materials and equipment. Not only the success of present efforts to expand this method of preservation but the future of dehydration as a peacetime industry hang in the balance.

To aid the effort to find suitable packages, FOOD INDUSTRIES has made a survey of the dehydration industry to find out what is being done. The results are presented in these pages, principally in the form of pictures of packages and pertinent facts about their construction and properties. Some of the containers shown still incorporate

On this page are shown several types of envelope package for dehydrated soups, a container that is widely used for this type of product. Taking them one by one:

Lipton's "Continental" noodle soup mix, which contains chicken fat, is packaged in a sealed transparent relatively moistureproof envelope which is inside a laminated cover envelope. The latter consists of a sheet of waxed paper glued to a printed paper covering. It is a new package now being "field tried." Thomas J. Lipton, Inc., Hoboken, N. J., is the distributor.

Sardik Food Products Corp., New York, has worked out in connection with Shellmar Products Co. a new package for its tomato soup flakes, and this type of package is being selected by some other dehydraters. It is made of MSAT cellophane laminated to opaque glassine, a material that can be used not only in the small "pillow" package but in bags containing up to 4 lb. The package is sealed and is moisture-vapor proof. The label design on the Sardik package will be changed from the form shown on "dummy" container pictured on this page.

"Minute Man" soup mixes have been taken out of foil and Pliofilm and put into a special moistureproof and greaseproof cellophane laminated to glassine. The distributor, Skinner & Eddy Corp., New York, finds this pack as satisfactory as the previous container.

Illustrating a type of dried soup package that has been adopted by several is the envelope container used by A. Goodman & Sons, Inc., New York, for "Noodleman" soup mix. The noodles are in a sealed printed waxed paper bag. And the soup base, including vegetable fat and dehydrated vegetables, is in a moistureproof heat-sealed cellophane envelope inside the package.

Metropolitan Packing Corp., New York, uses for "Tetley Jif-e" soup mixes a double-wall cellophane heat-sealed envelope, which surrounds a printed paper folder that holds the contents. The package is airtight and moisture vapor proof. It is filled both by machine and hand labor and also labeled by hand and machine. This package has been in use for about a year.

Barker Products Co., Los Angeles, puts up soups containing dehydrated vegetables in a waxed (both sides) glassine envelope that is sealed at the bottom and is closed with a stapled triple fold at the top. The company uses for its chicken soup (which contains chicken fat) a base that is especially prepared and said to be free from rancidity and spoilage. It is in dry granular form and the company reports that it does not require airtight packaging. And it is Barker's contention that noodles should "breathe" in the package. This type of package has been used by Barker for four years and has proved entirely satisfactory. The products are packed by machine.

Dainty Foods Manufacturers, Inc., Chicago, packages a dehydrated-vegetable noodle soup mix in a waxed paper envelope which is sealed at both ends. The company also has a package for noodle soup mix with chicken fat which consists of an outer waxed paper envelope and a moistureproof transparent sealed inner bag.

A vitaminized "V-Plus Junior Food" containing barley, noodles, dehydrated vegetables and other ingredients is packaged by Vitamin Foods, Chicago, in a double-wall opaque waxed glassine envelope sealed at both ends.

Cartons of various types are widely used for dehydrated soup mixes, as are the envelopes. And some packers put products in both cartons and envelopes. Here are typical cartons.

Enough vegetable soup mix to make two gallons of soup is packed in a moistureproof carton by F. W. Boltz Corp., Los Angeles. The carton is of laminated paperboard construction and has flaps with wide overlap to provide a good seal for "Pickwick" soup.

Goodman's vegetable noodle soup mixture is packaged in 3-oz. cartons which are sealed but not moistureproof. The noodles are loose in the carton, but the soup base is contained in a sealed paper envelope which is packed in the carton with the noodles. The packer is A. Goodman & Sons, Inc., New York.

"Susan Baker" two-minute pea soup mixture is packed by Union Food Products, Inc., Brooklyn, N. Y., in a heavily waxed sealed paper bag which is placed inside a lightweight unsealed carton.

"Kay's" chicken noodle soup mix, made by Food Craft Mfg. Co., Inc., New York, is packed three individual servings to a box. Each serving is in heat-sealed moistureproof cellophane bags, and three of these bags are contained in a lightweight carton which is not sealed.

scarce materials and will be changed. Others are in the experimental stage and may have to be altered. Others have proven their worth in years of commercial service. Taken together they represent a basis upon which dehydraters can develop successful packages for their products. Much has yet to be done, as indicated by the fact that many dehydraters reported to FOOD INDUSTRIES that their packages are only just being developed or are in the experimental stage.

If you are a dehydrater with a packaging problem, we suggest that you study the different packages illustrated and described on these pages and consider their characteristics in relation to the requirements of your product. In view of present conditions and future outlook, it is advisable to develop a commercial package that contains no metal, no glass, no foil and certainly no rubber. Yet, by all means adopt a package that will preserve the original quality of your product in so far as possible. Otherwise you will be a party to the untimely death of a new industry buried under an avalanche of consumer displeasure.

And in addition to looking over the field of dehydrated food packages, you will do well to consider containers being used for other products. One of the solutions to the problem of packaging dried eggs in the 5-oz. containers desired by the British came out of the cereal industry. Cereal manufacturers, as well as others, will package for the government millions of 5-oz. containers of dried eggs, using packages and packaging equipment similar to that employed for such products as "Kix." Several companies are doing the packaging. The Cracker Jack Co. has contracts to fill about 20,000,000 packages; E. J. Brach & Sons, 13,000,000; Armour & Co., 14,000,000; General Mills, 35,000,000; and Quaker Oats Co. and six or eight other companies have been

Kitchen Art Foods, Inc., Chicago, packages vegetable and noodle "KA Soup-er-mix" in double-walled tubes of MST DuPont Cellophane No. 51. One end of the tube is folded over and taped and the other closed by twisting. While the package is not completely airtight or moistureproof, the company says that it has served satisfactorily with the exception of one or two places where the humidity has been "beyond the control" of this package. But an airtight, moistureproof package is used for the company's noodle with chicken fat soup. It is made of "Maralux" and is heat sealed.

"Servett" noodle soup mix with chicken fat is packaged in an unusual container by The Julep Co., Chicago. A small fiberboard "pie plate" holds the noodles, and in the center is set a small paper tray containing the soup base. Over all is placed a printed transparent cover which is held in place by a fiberboard rim. This type of container was originally designed for pies. The package has the advantage of novelty and visibility; the noodles and the soup base can be seen through the cover.

Goodman packages a soup mix with vegetables in a printed cellophane tube, which is sealed at one end and closed at the other by folding over and fastening with transparent tape. The bulk of this mix consists of egg noodle products, split peas, lentils, and rice, but the product contains tomato, celery, onion, carrots and so forth.

There are several features about the package for the noodle soup mixture with chicken fat used by I. J. Grass Noodle Co., Chicago. In this package the chicken fat is encased in gelatine and glycerine, and has the shape of a small egg. Said to keep the fat fresh, this gelatine "egg" dissolves when the mix is placed in boiling water. The soup base is in a sealed waxed glassine bag, which, with the chicken fat and noodles, is placed in a bleached manila, 20-lb. paperboard carton. This carton is wrapped with cellophane, which is heat-sealed. The package is moisture resisting and fairly airtight. The noodles are filled by hand, the vegetable concentrate and chicken concentrate package by machine. This package has eye appeal and gets a good position on the grocer's shelf. It is easy to handle. It has been in use over three years and no change is contemplated. The same type of package, minus the chicken fat, is used for vegetable noodle soup.

Mixed vegetable flakes – carrots, tomatoes, onions, celery, spinach and parsley—are packaged in a lithographed can with a slide-back-to-open top, by Wyler & Co., Chicago. The sliding top is sealed with a transparent bag to make the can moisture-tight.

Isrin-Oliver Co., New York, has been packaging a vitamin-enriched dehydrated pea soup in glass jars closed with a rubber-lined metal screwcap, an airtight and moisture-proof container. And protection from light is afforded by the dark color of the glass. The company is working on a new package for "Tablette," in which the product will be packed in paper under carbon dioxide.

Klein Soup Co., Los Angeles, makes dehydrated soup mixes in brick form, the bricks being cellophane wrapped and packaged in 2-oz. cartons. The package is not airtight or moistureproof, but the bricks hold up well over an extended period of time.

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awarded contracts to make a total of some 56,000,000 lb. of dried eggs in 5-oz. packages.

The 5-oz. packages being used for dried eggs are of three types. One has an inner lamination of unbleached greaseproof material, with asphalt as the laminating agent. Another has an inner liner of paper and cellophane or glassine and cellophane and the third has a double overwrap. All are heavily waxed, and all are greaseproof, moistureproof and lightproof. And for special use in shipments to Hawaii, a glass jar is employed, but this has the disadvantage of not being lightproof.

One of the liners consists of moistureproof cellophane laminated to bleached sulphite paper with a film of thermoplastic adhesive medium.

If you intend to package dehydrated foods for the government, you will, of course, get copies of specifications for the containers for the particular products with which you are concerned.

And for commercial packages, you should consult with suppliers of packaging materials before expending too much of your own efforts. Many of them already have done much work on the problems involved in packaging dehydrated foods.

Some of the information on dehydrated food packages reported to Food Industries is not given in the captions for the pictures on these pages. One company which expects to supply dehydrated vegetables for Army, Navy and Lease-Lend will package them in 10-lb. hermetically sealed tins or 50-lb. moistureproof fiber drums. Another company reports that its sales of onion powder have all been in 5-gal. friction top tin cans, while onion flakes and chips are being packaged in double corrugated cartons with sealed waxed liners. This package is said to be very satisfactory and to permit very little absorption of moisture while the product is in storage for several months. On orders for the government, this company has been using 5-gal. tin cans for both powder and flakes.

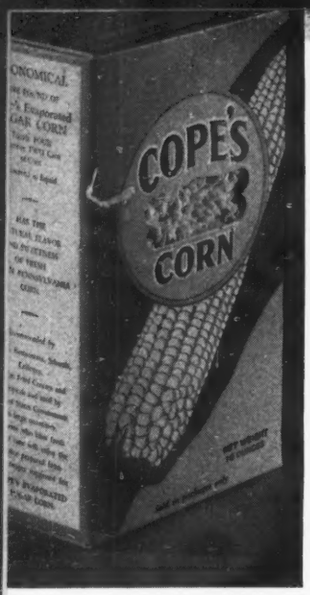
A manufacturer of flour from dehydrated potatoes, supplied to the baking industry, ships its merchandise in 100-lb. paper-lined burlap jute bags. And this company is changing over to multi-wall paper bags.

A company which supplies a line of dried milk products to bakers packs these products in 200-lb. barrels.

A vegetable concentrate manufacturer, shipping in bulk only, employs 5-gal. tins and heavy wax-lined cartons.

The Army Quarter Master Corps re-

Here are two types of containers used for dehydrated parsley, mint, onion and celery. Durkee Famous Foods, Elmhurst, N. Y., packs parsley and onion flakes in ½-oz. lithographed tin containers with friction closures. Little & Company, Chicago, has a package that looks similar but is of different construction. It is of fiber, or fiber and glassine, with tin top and bottom and friction lid. This is used for parsley, onion, mint, and celery. The company packs leafy vegetables in "moistureproof" chipboard. But onions, which are more hygroscopic, are packed in triple glassine lined chipboard to insure proper protection. The Little packages are filled by hand, to prevent breakage. The containers have the advantage of being convenient. They have been used 2½ years and will be changed only if conditions necessitate.



Twelve years is the record of satisfactory service set by the container for Cope's evaporated sugar corn. It is window carton made of 0.022-in. manila lined cardboard. It is neither moistureproof nor airtight, those qualities not being necessary for the product. The package is sealed by a semiautomatic machine. Being a folding box it takes up the least storage space and it is the "fastest packing package" the Copes Bros., Manheim, Pa., ever used.

Dehydrated skim milk, malt, kelp, mint, rhubarb, spinach, carrots and celery, with other ingredients, are contained in "Kevo," a food beverage made by W-H-Y and Kevo Products, Inc., Los Angeles, Calif. And this product is packed in a can with metal ends and paper walls, the latter being laminated and having an asphaltum filler. The package is "practically airtight and moistureproof." The cans are filled by machine. The container has been in use about three years. "Kevo" in the form of "Enurget" tablets is packaged in glassine envelopes closed by stapling, and also in rolls and cans.

Dehydrated apple "nuggets" which can be used to make apple sauce are packaged in a heat-sealed printed cellophane bag by Red-ee Foods, Inc., Los Angeles. The 3¾ oz. in the package will make a quart of apple sauce.

"Tato-Mix", a vacuum-dried potato product with national distribution, is packaged in a 4-oz. moisture resistant sealed paper bag, and this bag is put inside a carton. The product is packed by The Dalsey Co., Merrill, Wis.

quires that dehydrated vegetables be packed in a 5-gal. square can, preferably made of electrolytic tin plate body and bonderized black iron ends. The Army specifies metal containers because of conditions encountered in the field. Yet it is reported that the packaging for food dehydrated for the Army is not holding up. The reasons are the rough handling it receives, lack of transportation facilities, improper packing and lack of storage facilities in the field. Improper packing refers to sealing, strapping the cases and closing of any sort. Poor packing shows up when the packages receive rough handling, and when storage facilities in the field are inadequate if not entirely lacking.

While the Army wants metal containers, it is willing to consider containers of less critical materials if it can be shown that the material will stand up under conditions that tax the strength of a good metal container. And before the QMC will specify anything other than metal for overseas service, the new package will have to prove that it can stand up for at least twelve months.

In a general information sheet on the dehydration of vegetables recently issued by the Dehydration Committee of the Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, the section relating to packaging states:

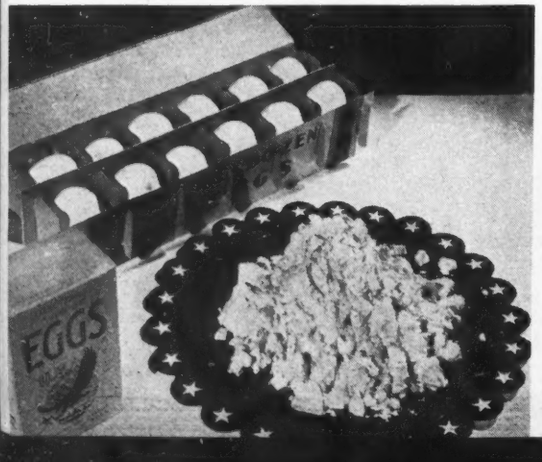
"Dehydrated vegetables must be packed in suitable containers which are moistureproof, moisture-vapor proof and insect-proof. Precautions should be taken to see that the product is not insect-infested before being put in the containers. For best results the packing should be done in a room with low relative humidity, free from dust and separate from the operating part of the plant. Five-gallon friction top tin cans which are spot soldered are ordinarily used as containers for dried vegetables. Moistureproof containers are being developed for the packaging of these products.

"In order to prevent insect infestation, and especially the deposition of insect eggs on the dried product, the packaging room and the packages must be kept scrupuously clean and fumigated if necessary. As an additional precaution, the products may be heated to 135 deg. F. for a few minutes immediately before packing. Packages must be closed directly after filling.

"Army specifications require that certain dehydrated vegetables be packed in an inert gas, such as carbon dioxide or nitrogen. These gases can be obtained in cylinders and the amounts of gas needed drawn off through a reducing valve and flexible tubing.

"The packaged material should be

When Britain requested tremendous quantities of dried eggs in 5-oz. packages, she tossed a real packaging problem in the lap of the American food industry. But the problem is being solved, and the Englishman will get his dried eggs in a family-size container. One of the ways of meeting the problem was to use packages and equipment of the type employed for cereals. And General Mills alone will pack millions of 5-oz. packages of dried eggs. The container is a special waxed package and the packaging equipment is similar to that used for "Kix." After being filled, the cartons are wax coated in an automatic machine.



Most of the large quantity of dehydrated eggs being produced now in this country are for Lease-Lend shipment. The eggs are usually packed in 200-lb. barrels with a double, crinkled, wax saturated kraft paper liner. Recently England has asked for dried eggs in 5-oz. packages for retail distribution.

Globe

Two specialty items containing dehydrated vegetables, packed by Little & Co., Chicago. The dressing mix contains dehydrated onions, celery and parsley, with sage, salt and spices. It is packaged in a sealed waxed paper envelope. The chili mix contains dehydrated onions and garlic, with other ingredients. It also is packaged in a sealed waxed paper envelope.

Vacuum-packed No. 10 tin is used for dehydrated potatoes by Sokol & Co., Chicago. A similar container is employed for dehydrated onions. The company's experience indicates that this pack has excellent keeping qualities.

The tin can is a very successful container for dehydrated cranberry flakes, but it will be replaced by a package made of nonscarce materials. Colley Cranberry Co., Plymouth, Mass., has been experimenting with paper containers and expects to find something suitable. The problem is made difficult by the fact that dehydrated cranberries are very hygroscopic.

Two little glass containers for a couple of potent products, garlic powder and onion powder, dehydrated by Little & Co. Chicago. Screwcaps are used as closures.

stored in a cool dry place. The lower the storage temperature, the longer the life of the product."

Specifications for barrels and liners for dried eggs have been issued by Agricultural Marketing Administration. These call for standard commercial barrels to hold 150 to 200 lb. of the product. And each barrel shall have two moistureproof liners, the inner one not less than 35-lb. crinkled lining, 15 percent wax saturated; the outer not less than 45-lb. crinkled lining, 60 percent wax saturated. The linings shall have closed bottoms and be long enough for tying or sealing at the top. The two linings are sealed or tied separately.

Specifications for the 5-oz. package for dried eggs have been issued by Federal Surplus Commodities Corp. One style is a regular flap and rectangular shaped folding carton, with full overlapping long flaps, with or without a 30-lb. overwrap. The stock shall be sized kraft-faced chipboard, good bender, 0.018 to 0.020 in. in thickness, of which 0.005 in. is sized kraft facing.

The finished package must be made water repellant by an exterior coating of wax or the like, applied by spraying or dipping to approach an unbroken film. The package must be made grease resistant by an inner lamination to the package walls of 25-lb. unbleached greaseproof material or by an inner film of grease-resistant compound.

The package must have light-absorption properties obtained through the use of asphalt as a laminating agent for the greaseproof material or through the use of stock of sufficient density to exclude all light.

A barrier to moisture vapor must be provided by the asphalt used as a laminating agent or by the inner film of material specified above, plus the exterior coating.

Specifications for a second style of dried egg package call for a prelined rectangular container consisting of an inner liner made from moistureproof and greaseproof material and outer supporting carton from waxed or moisture-resistant boxboard. The stock is 0.018-in. bleached manila lined chip. The inner liner must be heat-sealed.

In about 20 years the canned dog food industry grew from nothing to about 700 million pounds a year. Then the tin conservation order took the product out of cans. Dehydration was the industry's answer to that one, and here are four of the resulting products. "Ideal" (Wilson & Co., Chicago) is packaged in a square paperboard carton with glued ends. "Pard" (Swift & Co., Chicago) and "Red Heart" (John Morrell & Co., Ottumwa, Iowa) are both in cylindrical paper (chipstock) boxes with a slip-over lid. None of these is air-tight or moistureproof. The fourth package shown here is a heat-sealed cellophane container. It is for "Snappy," packed by Foster Canning Co., Inc., Glendale, N. Y.

What Packages to Use For Dehydrated Foods*

By L. K. HARPER
Sardik Food Products Corp., New York, N. Y.

Here is help on your packaging problems. It is a comprehensive discussion of how to package dehydrated products, by an outstanding authority. The different types of foods and the various kinds of markets are taken into consideration. New developments are mentioned

As the armed forces constitute one of the most important markets for dehydrated foods, I shall discuss their needs first. Later I shall take up the newly created commercial market.

Almost from the first, the only package which has been extensively used by the Army is the tin can, and it will probably continue to be the favorite so far as the tin supplies permit. No other type of container in use or in prospect has all the advantages it possesses. It is:

1. Moistureproof.
2. Vaporproof, airproof.
3. Greaseproof.
4. Odorless.
5. Tasteless.
6. Nontoxic.
7. Insect-proof.
8. Gasproof.
9. Noncorrosive.
10. Insoluble in water.
11. Capable of holding a vacuum; adaptable to gas-packing.
12. Strong and durable.
13. Most proof against changes in temperature.

Certain types of dehydrated foods require packages with all these features. In many other cases less perfect packages will be found fairly satisfactory under all but the most unusual conditions.

The first dehydrated foods imported into this country were packed mostly in tins—Chinese eggs, for example. Others were compressed into small cakes which were wrapped in waxed paper and placed in a paper carton. Briquettes of this type were used during the Civil War.

The Army has followed both precedents; it uses compressed products as well as canned ones—bouillon cubes, for example. But, in general, the compressed products have been found unsatisfactory because they are harder to prepare and lose flavor more readily. However, we have been making some experiments which indicate that a loosely compressed cake may well prove a great aid in solving our packaging problem.

In recent years some experiments have been conducted with paper bags, liners and cartons, but in most cases it has been found necessary to pack the bags or cartons in large tin containers to prevent insect infestation and moisture absorption. Fifteen-ounce cartons of apples, for instance, have been packed 30 to a sealed tin, and wax-impregnated crepe-paper liners, two to a barrel, have been used in shipments of dried fruits to England. But it is significant that where paper bags, liners and cartons or liners and wooden boxes or barrels are used, it is recommended that the food be used within three months. While Army experts are making tests of all sorts of new paper containers, of plastics and of packages of laminated construction, in almost every case something necessary to a completely acceptable product is lacking.

Of course Pliofilm and other products containing rubber have been found to meet almost every requirement, but the Army wants to eliminate them, if possible, until the rubber situation is altered. And the rubber products are subject to puncture and pinholing.

However, even if there should be no other answer to the problem of proper preservation of dehydrated foods except the use of pressure materials like tin and rubber, dehydration would still make possible great savings in these materials. One can of dehydrated food is equivalent to 10 cans of other foods, and the concentration can be even greater. For example: Cranberries used to be packed 1 lb. to a No. 10 tin—a three-quart container—and even this one pound was equivalent to 25 lb. of jelly. Now, because of improvements in processing, cranberries are packed 4 lb. to a No. 10 tin. Cabbages pack best about 7 lb. to a five-gallon tin but, if necessary, can be packed 10 or 11 lb. to the can; the pieces might be broken up but the product would not be affected. Such foods as soups could be ground finer without damage, making possible a great saving in space and weight. It has been estimated, moreover, that 10,000,000 laminated bags with protective rubber coatings, each equivalent to a five-gallon tin, would require only 143 tons of rubber. There are probably a number of ways in which rubber is still used in greater amount to less advantage.

What the Army Needs

The Army and Lease-Lend will use the following dried foods, according to present plans; soups—corn, pea, bean, tomato, vegetable and special formulas; vegetables—onions, cabbage, carrots, potatoes (sweet and Irish), beets and turnips; fruits—apples, cranberries, citrus fruits and apple sauce; tomato juice; dried eggs and dried milk.

Containers for bulk packaging of eggs and milk appear standardized as follows: 200-lb. barrels, made of soft wood (fir, elm, poplar, soft maple, etc.) with double liner of parchment, waxed, 45-lb. wax in outer layer, 15-lb. on inner layer; smaller inner liner—slack-filled. Also used for eggs and milk are 4- to 5-oz. individual packages of "thermophane," a laminated cellophane bag with thermoplastic seal which is placed in a cardboard carton. These are packed 24 to 48 to a wooden case.

For carrots, cabbages and tomato products, either No. 10 or five-gallon tins, vacuum-packed or packed with an inert gas like nitrogen or carbon dioxide, will be used.

Pea and bean soups are not very hygroscopic and can be packed in ordinary wax-coated paper cartons. If the cartons are tightly sealed, no liner or bag is needed, but when the product is intended for use by the Army, the cartons should be packed in wooden boxes. Potatoes and cranberries are easy to keep and can be packed in cellophane-backed paper bags, heat-sealed.

It should be remembered, however, that tin cans must be used for all products when long storage life is desired. Also, insect infestation will be a problem, particularly in tropical countries, over even short periods of two or three months.

Because of the rough handling to which packages are subjected in the Army and Navy, wooden cases are advisable even with tins, and all bags should be inserted in cartons to protect them against puncture. And while the Army

* From a paper presented at the Packaging Conference of the American Management Association, held in New York, April 14-17. Published with the permission of the American Management Association.

is interested in many small individual-type food packages, these will not be used for dehydrated foods so much as for the regular individual rations, which are concentrated foods, or dried foods.

Packages for the Trade

With tin and rubber so greatly restricted, the extent to which dehydrated fruits and vegetables will be used commercially may well depend upon how good a package can be made of non-defense materials.

First of all the dehydrater processor or distributor should know in advance what he wants and not depend upon the chemical manufacturer, the paper manufacturer or the container manufacturer to tell him. Once he has prepared his specifications, however, it should be up to the container manufacturer to tell him how feasible they are. Too often products have been delayed in reaching markets because certain producers of packaging material have made claims which never could be substantiated, and weeks have been lost in useless tests.

All interested parties should get together and exchange information. If they are familiar with the materials and processes which have been tried and found unsatisfactory, much research time can be saved. Almost all the dehydrators have expressed a willingness to cooperate by making tests of materials with their products or by providing materials with which the packager can make his own tests. Full data on all tests will be furnished, including comparisons between all classes of materials tested.

Dehydrated foods may be divided quite simply into three classes according to the degree of difficulty one encounters in packaging, storing and keeping them. If you confine your attention to the easiest class, you can participate in the dehydrated food-packaging business to a very large extent and with little or no trouble.

Simple coated paper bags or ordinary cartons will serve in some cases; in others special coatings of a type readily available should be added to combinations of bags and cartons. Newly developed laminated bags should be used with larger packages, such as the 10-, 25- and 50-lb. sizes. In all cases a tight seal, usually a heat seal, is recommended, and protection against light is always desirable.

In fact, the perfect moistureproof package which can be vacuum-packed is not necessary for more than one-half the dehydrated foods you may be asked to package. By this I do not mean to imply that the best type of package would not be more desirable under all circumstances; it would be a guarantee against loss of flavor and prolong storage life, but it is not always absolutely necessary.

Examples of products reasonably easy to package are potatoes, pea soup and potato soup—all big sellers. More difficult are bean soup, cranberries, beans, onions and parsley—good sellers also. Hard-to-pack foods include cabbage, carrots, tomatoes, bananas, dried whole milk, vegetable and chicken soup.

Types of packaging which should take

L. K. HARPER

care of each of the above groups might be as follows:

First Group—No. 450 single MSAT cellophane, semi-opaque.

Second Group—No. 300 MSAT Duplex laminated, opaque.

Third Group—Single No. 450 MSAT cellophane laminated to double glassine, opaque.

A thermoplastic seal should be used for all three groups.

In addition, if the packager will study the characteristics of other dehydrated foods he will undoubtedly find many for which his products will be entirely suitable. Kraft paper, parchment, glassine, cellophane and other types of paper and plastics are satisfactory when chemically treated, either alone or in combination, for all except the more hygroscopic foods. But the shelf life of foods so packed is fairly short—about six months.

Care in cutting down inventories and emphasis on rapid turnover will help solve the packaging problem also. Proper selling is essential, too; sell the storekeeper on the "first in—first out" principle.

Some distributors to whom I have talked object to using three or four kinds of packages; they think their line would look unattractive so packaged. This problem could be solved by standardizing the carton and using different bags or liners. If we all were to wait for the perfect package and then try to use it, bottlenecks would develop immediately.

Many of the rigid specifications required by the Army need not be followed in the commercial field. Protection against insect infestation, gas-proofing, resistance to severe changes in temperature, and protection against excessively rough handling are not essential, nor is long storage life. On the other hand, the commercial field is far broader and taken as a whole has many problems not associated with Army needs.

Let us take a look at the industry as it is constituted today. There are 30 members in the National Dehydrators Association, only 18 of whom are active dehydraters, the others being distributors or equipment manufacturers. The members do 90 percent of all the dehydrating of fruits and vegetables in the country. Egg and milk driers are a separate group, and number about 60.

Approximately 100 products are dehydrated by all manufacturers. As a rule egg and milk driers stick to their respective products, several of the others specialize in one or two products such as potatoes, onions or tomatoes, although their equipment could be used for other products if the market warranted it. One or two companies dehydrate fruits alone—and perhaps one or two vegetables to fill in between seasons.

At present most of the foods produced go to the government, and of the remainder by far the larger part goes to distributors; few dehydraters attempt to distribute their own products to the retail trade. Sales in 1941 amounted to about 20,000,000 lb. The industry's capacity is now about 100,000,000 lb. per year.

Distributor's Responsibilities

It takes three people to set up the proper type of package—the manufacturer, the distributor and the container maker. Many small distributors have completely ignored suggestions from the manufacturer and have marketed foods in containers which were at the best unsuitable, containers in which the product deteriorated rapidly. In these cases the dehydrater was blamed for turning out products of inferior quality.

The distributor's first job is to select his product carefully. If it is one now being dehydrated, the best form of package may be in use. Or if he wants some canned product of his own dehydrated, the field to select from is wide. Of about 3,200 plain and fancy products found in grocery stores today, it is estimated 1,700 are dried, dehydrated or capable of dehydration. Of 600 principal items which form the backbone of the stores' business, over 300 are dried or could be dehydrated satisfactorily, since some slight change in present for-

mulas would make many products eligible for dehydration. For example, in soups, substitute skim milk for whole milk, eliminate other fats and then tell the housewife to add a pat of butter when seasoning to taste. Removing fats prevents rancidity and aids in packaging.

In general, I recommend considering products which heretofore have been packed in big, cumbersome packages like glass jars or heavy bottles as well as those that have been tin-packed because transportation in this country is going to become more and more difficult.

Remember, many of our packages today look right because we are used to them, but upon closer examination do not justify themselves. In some cases the manufacturer virtually admits this by stating that one-half the water has been removed—for example, from the tomato sauce accompanying spaghetti dinners. If you are going to remove half the water why not all of it? I predict that next year you will see a lot of condensed products really condensed—or dehydrated.

Second, the distributor must select his market. Should it be national or local; specialty, retail, wholesale and manufacturing, institutional, foreign or government? In many cases the market selected must be considered in deciding on the type of package to be used. For a national market there must be longer shelf life than for a local one. For retail sales, small packages, which present a more difficult set-up than the larger wholesale packages, are necessary, even though smaller packages absorb moisture more quickly. The foreign market—in South America, for instance—offers the same problems as the war market, with some exceptions. Extremes of temperature and insect infestation are problems there.

Third, the distributor must select his outlets. Does he plan to distribute his product through grocery stores, drug stores, department stores, bakeries, health-food stores, specialty shops, supermarkets or by wagon routes? There is a package problem for each form of outlet. Wagon routes, for example, require the most compact package obtainable; health stores, on the other hand, sell fairly large individual packages.

Another point to remember is that we must not get ourselves into new bottlenecks by selecting scarce materials or packages requiring much new packaging machinery. We are not saving much if we have to build a new machine for every one we give up. Look around and see what industry is affected by shortages; maybe you can help it out by using its packaging equipment—the tea business is an example.

Suppose we say then that a distributor has decided to go pretty deeply into the marketing of dehydrated foods on a national scale, offering his products through grocery stores, drug stores, department stores and to institutions. If his products were potatoes, carrots, pea soup, tomato soup, chicken noodle soup, parsley, onion and mint seasonings, cranberries and pumpkin pie, these are facts he should remember:

1. Potatoes will pack in cellophane-glassine or parchment when properly sealed and coated. They need little protection from light and will have six months' shelf life.

2. Carrots must have moistureproof, opaque bags and should be vacuum-packed; otherwise they have only three months' shelf life.

3. Pea soup needs only a properly sealed paper carton for six to eight months' life.

4. Tomato soup requires moistureproof, vaporproof bag, and an opaque cover with a thermoplastic seal for six to eight months' shelf life.

5. Chicken noodle soup requires a moistureproof, greaseproof, thermoplastic sealed bag for four months' or more shelf life, depending upon treatment of fat.

6. Of the onion, parsley and mint seasonings, the onion is the most difficult to pack since it must be kept in a cool place. Coated paper boxes or cans are satisfactory and may have spout or replaceable tops of plastic.

7. For cranberries moistureproof bags should be used, heat-sealed with paper covering to keep out light; small glass bottles with plastic tops are suitable also.

8. For pumpkin pie one needs a moistureproof, laminated bag of cellophane and paper, or some similar combination. The bag should have thermoplastic seal.

Institutional Packages

For institutional sales we use steel drums of the rubber-gasketed sealtight type, which can be used over and over again. As a substitute, wooden barrels with double liner of laminated asphalt and paper construction or waxed paper will serve, but for very short periods only. However, in bulk packages the absorption of moisture throughout the package is slow; and if the product has a tendency to lump, it can be broken up very easily. Success here depends on keeping your stock moving rapidly.

A dehydrater can help the distributor with his package problem by maintaining a sanitary plant, by guarding against insect infestation, by packing promptly in air-conditioned rooms, by taking full advantage of opportunities to curtail inventories and shorten storage life. He can also operate small plants in different localities to take advantage of two crop seasons per year.

In general, dehydrated foods begin to lose flavor and vitamin content after three or four months unless they are properly protected against moisture and infiltration of oxygen. The "hay" flavor or odor may be noticeable immediately after dehydration if processing has been careless, but more often it is caused by poor packaging. Foods having this odor or flavor are edible but not attractive. Also, dehydrated foods when caked through heavy absorption of moisture are edible but difficult to prepare for serving. Most products will stand 2 to 3 percent absorption—some even more.

Packaging Materials

As to packaging materials, the situation at present is, briefly, as follows: (1) There is no entirely satisfactory substitute for either the tin or the rubber and foil package; (2) several materials show promise, but sufficient tests have not been made to be certain. We are now testing over 30 different types of containers in our laboratories and shall be glad to continue our work with any others submitted.

From all reports gathered so far—from both Army officials and commercial users—the packages listed below appear to be the best available. But even now there are rumors of more restrictions, so each item should be checked.

1. Tin cans. There are no restrictions as yet on packaging dehydrated vegetables, although regulations may be changed any minute. So far as commercial packing is concerned, the best types to use are the No. 10 tin (three-quart size), the two- and five-gallon tin cans—those with friction tops, those sealed with shellac or similar material, or those hermetically sealed. No small cans should be used except for Army rations.

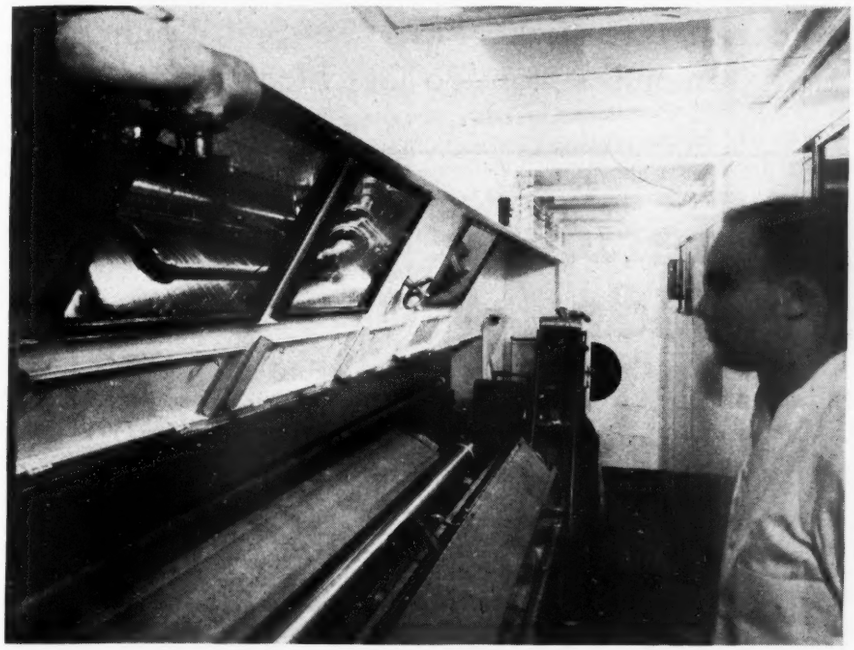
2. Duplex glassine laminated with either No. 300 or No. 450 MSAT cellophane. Use a thermoplastic seal.

3. Thermophane — M S T cellophane bonded to paper with special coating. A thermoplastic seal should be inserted in the cardboard carton. Forty million five-ounce packages of this kind were recently purchased by the government.

4. Laminated kraft paper with a double layer of asphalt and other materials including MSAT cellophane. Use a thermoplastic seal. (This type should be used when larger bags are needed.)

5. Sugar barrels, No. 2 slack size with two parchment liners, impregnated with wax—outer liner 45 percent wax and inner liner 15 percent; inner bags slack-filled, bags tight-sealed. (This is for bulk shipments.)

Accelerated laboratory tests show that vegetables or fruits packed in these cans and boxes and containing not more than 6 percent moisture should not show absorption of more than 2 percent additional moisture in 10 to 12 months when stored at 95 to 100 deg. F, 90 to 95 percent relative humidity. And they should show less than 5 percent loss of flavor and vitamin content and no color change.



Sardik dehydrating unit. The product comes from a pulper and discharges through perforated pipes onto the drying drum seen through the windows. A scraper knife removes the dried product from the drum in the form of a thin sheet. This sheet passes under take-off rolls (lower foreground) and into a screw conveyor at the bottom of the unit where it is broken up. The product is then conveyed to the packaging department. The drying room is air conditioned to keep the humidity low.

Some of the interesting new developments, not yet ready for market, are:

New laminated bags with substitutes for all pressure materials.

New forms of cellophane lamination, more nearly moistureproof.

A band can—kraft paper with metal ends. This is said to be as good as a tin can, but machinery is the bottleneck which is preventing its use at present.

Black metal. An improved handling process has been developed but recent restrictions indicate difficulties in supply.

And here are a few statistics on the savings made possible by dehydration:

The weight of bag and carton packaging is often as little as 1/35 of that of tin cans. The lowest ratio would be about 10 to 1.

If dehydrated foods had been available and had been used wherever possible, Agricultural Marketing Administration (Lease-Lend) purchases from March 15, 1941, to March 15, 1942, which weighed 7,600,000,000 lb. would have weighed 1,600,000,000 lb. less—a saving of 80 ships of 10,000-ton capacity.

The saving in costs by the use of packaging materials other than metals averages approximately 23 percent. On one comparatively small order for dehydrated soups recently placed by the government, this saving was over $35,000. Multiply this a few thousand times and you get an impressive total.

That it will take a lot of machinery to make new packages is clearly illustrated by the fact that the average small bag machine making 60 units a minute will produce approximately 72,000 per 24-hour day, or 21,000,000 a year. And it will require the operating time of five machines for a whole year to handle just one order recently placed. The total output of this machine manufacturer for 1942 will not exceed 20 machines. It is estimated that at least 250 machines may be necessary in 1943.

I have been asked to comment on the advantages of tight versus breather packaging. The breather package is not satisfactory for use with vegetables or fruits as there is no pressure within the package from gas being given off—as there is with coffee, for example; hence a breather package might very well admit oxygen as well as allow gases to escape.

There is also the question of protection against insect infestation. The only way to insure such protection seems to be to use tin cans, particularly if shipments are to be made into tropical countries and stored for any length of time. In this country insect infestation is more apt to occur because there were eggs in the dehydrated foods than because penetration from outside the package took place.

For shipments to tropical countries, the tin can has proved to be the only thoroughly satisfactory type of package. Excessively high temperatures affect dehydrated foods adversely. Where temperatures often reach 125 to 135 deg F. dehydrated products can spoil in a few days. Dehydrated foods keep beautifully in extreme cold—no moisture to freeze.

One must also consider conditions within the ship. If the packages are in the hold or on deck, they may be subjected to high temperatures at times. High temperature would ruin onions, for example, if they were subjected to it for as much as 40 to 60 days.

Another subject of constant discussion today is whether or not compressed dehydrated food packages are satisfactory. In many respects they are more satisfactory than the powder or flake forms. One of the things which most readily affects the keeping qualities of dehydrated foods is oxidation. In the powder form it is estimated that these have 1,000 times the exposure in one three-ounce bag that there is in a compressed cake, 1 in. by 2 in. If the outer surface of the compressed cake oxidizes, it has a tendency to seal the cake and thus protect the inner portion perfectly; hence, if packing is bad, at least a portion of the product is preserved. On the other hand, compressed packages are more difficult to rehydrate, and unless the compressing is done carefully some vitamins and part of the flavor are destroyed in the process. And the instantly rehydratable type of dehydrated foods in which we specialize cannot be compressed tightly without destroying their most attractive feature—instant rehydration without cooking or soaking.

The importance of saving material in packaging and space in shipping is so great, however, that we are forced to consider the relative advantages of powder or flake forms and the cake form. We come to the conclusion that some half-way measure would be most advantageous, such as a loose compressed cake which would be barely tight enough to hold its form while being packaged. Such a type could be broken up very readily by crumbling in the hand.

We have been experimenting with bananas for about two years and have worked out a cake to be used with a lifeboat ration. This may prove sufficiently valuable to warrant extension of the process to all types of products.

The present may look very unpleasant with all our problems of changeover, but it is a picnic to what next year will bring forth. Probably the steel available to the food industry will be reduced by 300,000 tons—enough to take care of 2,100,000 tons of food. There won't be half as many cans in 1943 as there are this year, and we'll have five times as many soldiers abroad to supply. So let's all give a helping hand to dehydration—a boy trying to do a man's job.

Select Floor Materials To Suit Plant Needs

By RICHARD KANEGSBERG
Kayel Engineering Co., Newark, N. J.

Part I—Floor constructions are available in a wide range, enabling the food manufacturer who selects his floors to suit his plant requirements to obtain economical and trouble-free service

ARGUMENTS about floor construction usually center about what are wryly called "headache floors." The reason is simple, for any floor can be a "headache floor" if it does not fit the job it is supposed to do. As a matter of fact, the actual percentage of real "headache floors" is very low. If more real thought were given to material selection, in place of grab-bag methods of choosing from a limited number of vaguely understood floors that are too often followed, there would be even fewer headaches.

In dealing with floors, it should be remembered that the law of gravity has not yet been repealed. Everything hits the floor. Yet when construction is being considered, the floors generally have attention last, and get only the tail end of the budget. The net result is often something like this: Fancy tile walls, beautiful enamel work, plate glass, stainless steel—and a floor that looks as if an army tank division had just passed through in a hurry.

Construction of a modern food plant involves so many materials that it seems almost an impossible task to try to judge each material on a common basis. To apply the first-cost yardstick, without including the perhaps compensating factors of maintenance costs and rate of deterioration, may result in the selection of floors that fail to give satisfactory service. In contrast, if the quality yardstick alone is employed, without considering the factors of economic life, money is often wasted in the purchase of materials too good for the job to be done. Then again, some materials are useful in a wide range of applications while others are strictly limited in their use.

Because the scope of this article does not permit full discussion of each material, it is limited to a brief outline of the possibilities. However, if we can once define the various factors of any problem and fit some material to that problem, then the way is clear for further study of the selection. In the study of materials available for industrial flooring, the decisive factor that determines whether a material is suitable or not is the traffic load that the floor must withstand. Load and traffic problems must be divided in three groups, based roughly on the intensity of service. These groups may be designated as light, medium and heavy service.

Types of Service

Light service applies to such areas as offices, sustaining light foot traffic only, widely distributed and not concentrated in definite pathways.

Medium-service areas are well-traveled pathways for foot traffic and all areas supporting light trucking, with wheel loads not exceeding 500 lb.

Heavy-service areas are all warehouse spaces, trucking aisles, loading platforms, barrel runways and, in general, all areas supporting wheel loads in excess of 500 lb.

In the following discussion the reader must keep in mind that in many parts of the country there are local materials available that are not well known elsewhere. Concrete aggregates vary widely in character and durability as well as in cost; local quarries may make it possible to install stone floorings at low cost. The floor should be fitted to the job as far as it is possible to determine the service required and the physical characteristics of the flooring selected.

Wood Floors

Oldest and most widely used of the common floorings, wood is obtainable in a number of forms suitable generally in the light-service or medium-service classes. Softwood floorings such as yellow pine, quarter-sawed or with edge grain, are used for light service or as a support for more durable flooring surfaces in heavier service. Oak flooring is more resistant to wear than pine, but is commonly used in office or showplace areas where fine varnish will bring out the grain pattern for decorative effect. Northern hard maple is considerably more resistant to wear and may be used in light trucking areas of the medium-service class. It will stand up under repeated scrubbing and cleaning if allowed to dry thoroughly before traffic is allowed to pass over the surface.

Wood-block flooring is widely used in machine-shop areas. Standard-size blocks 4 in. thick are set on an asphalt base and the joints between the blocks are flushed full of hot asphalt. Such floors are capable of taking heavy trucking loads yet will not damage dropped tools and are quite free from "dusting." Repairs may be made with comparatively small expense and loss of time. Other wood-block floorings are available in several patented forms, some prefabricated in large squares ready for mounting on a prepared base, others mounted on strips.

Producers of the various woods have issued many well-prepared booklets describing the possibilities of their products and giving detailed instructions for the selection of the proper types, grades and sizes of lumber for flooring purposes. It is important that, in the selection of wood floorings, proper consideration be given to the probable life of the surface and to maintenance costs over that period of time, as well as to the cost and ease of repair.

The sad fact is that many wood floors are allowed to deteriorate to an advanced degree before thought is given to repair or replacement of damaged sections. The "stitch in time" saves large sums when applied to wood floorings, and it may often be possible to apply a tough wearing surface over an

old wood floor without extensive strengthening work if the old floor has had reasonably careful maintenance attention during its life. As with every other material, the success or failure of a wood floor depends upon careful selection, a proper foundation and a workmanlike installation.

In ordinary construction, softwood or hardwood floorings may be nailed to joists or to wood sleepers imbedded in concrete. A better type of installation should include a subfloor nailed to joists or to sleepers with the finish flooring nailed diagonally to the subfloor. Wood floors supported on concrete bedded in the earth, as in basement areas or cellarless first floors, should be damp-proofed with an underlay of tar paper and further protected by having provision for air circulation under the wood flooring. It is important to see that dampness and termite infestation be blocked off and guarded against by proper shields and by chemical means. Floors exposed to the weather should be built of oak or cypress and must have provision for quick drainage, expansion and contraction. A common construction detail calls for 3x6-in. planks with ½-in. open joints.

Wood floors may be hardened through the use of certain liquid treatments which penetrate porous areas and set up as hard substances in the body of the wood fiber, but the success of such treatments may be prevented by the presence of soaps, oils or other substances which might inhibit the setting of the finish.

Composition Floors

Magnesium oxychloride compositions or similar compounds have been widely used for many years, being commonly known as "magnesite." They are suitable for light service and are obtainable in a variety of colors. Installation of this material should be made by mechanics who are thoroughly familiar with the procedure as the technic is exacting and improper handling will result in a poor job. The composition is applied over wire mesh which is nailed to a wood base. Dressing the composition surface with a linseed oil coating will prevent roughing and dust if applied after the floor has been in service for several months. This type of floor is subject to cracking and buckling under heat conditions. If it is necessary to wash the surface often, the oil treatment or wax must be used.

Asphalt Mastics

Asphalt for floor surfacings is used in several forms differing in method of application, wearing qualities, resistance to liquids and other important considerations. Hot mastic is composed of asphalt, stone or gravel, and sand in precise proportions, and is placed hot over heavy paper applied to wood or concrete bases, being worked with hot tools to the required surface and grade. The material will stand moderate trucking, but will indent under standing loads and will erode if flushed with hot water. Another form of hot mastic is in the shape of bricks which are set on an asphalt bed without any jointing compound. Such bricks are slightly more resistant to truck traffic than the hot applied mastic, as the asphalt is formed under pressure and the resulting brick is denser.

Cold-applied asphalt mastic floors are used for light and medium service. Recent developments in this class of material have brought to the market a flood of cure-all floor surfacings having asphalt emulsion as a binder mixed in varying proportions with portland cement, gypsum, sand and numerous grades of volcanic rocks, granites, trap rock and other stone. Advertising claims are sometimes irresponsiblly made, and if they are always accepted at face value may lead to trouble and disappointment. But the material has definite value if carefully selected and properly used. As a repair topping for worn concrete or wood floors, or as an underlay under harder surfaced floorings, cold mastic has little competition, since the cost is low and its use may assist in salvaging an otherwise hopelessly damaged floor. The installation of cold mastic, except for patching, should be placed in the hands of experienced workmen skilled in the proper compounding and placing of the mixtures. Different formulas are used, depending upon the thickness of the coating, the traffic load, temperatures, condition of the supporting floor and the finished appearance desired. It is now possible to prepare a compound completely acidproof, containing no alkaline ingredients to react with acid solutions.

Asphalt-impregnated Felt

The cheapest form of floor covering suitable for light service is an asphalt-impregnated felt which is sold in rolls similar in appearance to ordinary roofing felts. The covering is cemented to wood or concrete bases with an asphaltic cement. The material is thin, but the surface is quite durable if it is protected against cutting and tearing. It cannot be easily repaired. Because of the light gage of the sheet, it is almost impossible to remove it once it has been on the floor for any length of time, and this presents a serious objection if it is desired to make repairs or to replace it with a more permanent form of floor covering.

Linoleum

The best known of the floor coverings is linoelum, suitable for light service, low in cost, easily installed, low in maintenance cost but not easily repaired. Concentrated foot traffic is

In this bakery, a wood floor of hard maple, laid diagonally on an under flooring, gives satisfactory and economical service under the light service conditions encountered.

This floor of Belden "A" floor brick makes a sanitary and economical flooring of attractive appearance in this food preparation department of a large retailing and catering establishment.

likely to wear a linoleum surface and care should be taken when deciding on a floor covering to be sure that even distribution of the load is possible. Linoleum should not be installed below grade or on ground-level floors unless provision is made for thorough protection against seepage of water, condensation or flooding, and arrangements are made for air space under the floor.

Linoleum Tile

More resistant to heavy foot traffic is linoleum tile. As made by some manufacturers, such tile is individually pressed and is more dense than other tile cut from sheet linoleum. It is suitable for such areas as plant cafeterias. Although higher in price than sheet linoleum, the tile is easier to maintain, and damaged sections may be readily replaced without marring the appearance of the floor.

Rubber Tile

Although rubber tile is the highest in price of the sheet types of flooring, yet the exceptionally fine, clear colors obtainable in this material, as well as its resilient qualities, make it very useful where appearance and beauty are the principal factors in selection.

Hard Composition Boards

There are a few composition sheets usable as underlays between worn wood floors and new traffic coverings. Such sheets are usually made of highly compressed wood or other cellulose fibers, or of laminated wood veneers in various thicknesses ranging from $\frac{1}{8}$ to $\frac{3}{4}$ in. and more. The sheets may be fastened down with drive screws and make a suitable surfacing for the laying of linoleum, asphalt tile or other coverings for light and medium service. Care should be taken that common nails are not used to fasten the sheets, as the flexing caused by traffic loads will cause the nails to pull up and punch holes through the top covering.

Asphalt Tile

Steady improvement in the manufacture of asphalt tile has produced a serviceable and inexpensive floor-surfacing material with a wide variety of uses, the most important of which is in the retopping of splintered or worn floors. The tile comes in thicknesses ranging from $\frac{1}{8}$ to $\frac{3}{8}$ in. and may be had in a wide variety of colors. A separate grade of tile is manufactured for industrial applications to handle wheel loads in excess of 1,000 lb. without cutting or marring. It may be used for even the heaviest service if precautions are taken to see that no greases, fats or oils or solvents are allowed to reach the floor. Grease-proof tiles are manufactured but these are not quite as resistant to traffic wear as the regular types, and should only be specified where rolling loads are not encountered.

Being somewhat brittle when unsupported, the tile cannot be used over a rough surface, and it is customary to level up such a surface with an underlay of a special asphalt emulsion compound to make a flat surface for the tile. When proper precautions are taken and the manufacturer's directions are closely followed, asphalt tile may be very successfully applied to floors below grade and will not be affected by dampness. Industrial types of asphalt tile make excellent coverings for ramps and give a slip-proof surface. Over wood floors, asphalt tile is usually applied over a lining of felt which is cemented to the wood, while over concrete, the tile is cemented directly to the concrete surface. Where the concrete is below grade or in direct contact with the ground, it is important to obtain asphalt tile that is alkali-resistant to withstand the possible effect of alkali salts leached through the concrete by damp conditions. Properly installed, an asphalt-tile floor surface will stand more moisture than other floor surfacings and will not curl or pull up under traffic.

Concrete Floors

By far the largest areas of floors in industrial use are constructed of portland cement concrete. Well proportioned, properly placed, and correctly cured, a concrete floor should be dust-free, hard-surfaced and practically waterproof. Despite the large amount of literature and technical reports disseminated by the Portland Cement Association, the impression still holds, at least among mason contractors as a class, that "concrete is concrete." Rare indeed is the contractor who has an understanding of the correct proportioning and handling of concrete mixtures made up for specific purposes and who is able to control accurately the composition of such mixtures without variation from a set formula. On large public works, on roads, on municipal sidewalk projects, even where ready-mixed concrete is used, it is necessary to have an inspector whose duty it is to see that the specified mix is delivered in good condition and that it is properly placed. What, then, in an industrial installation where such technical supervision is rare? Is it any wonder that we find supposedly well-laid floors dusting, cracking and wearing out without apparent reason? The answer to all this is responsible supervision.

Part II of this article, with information about the other types of floors not contained in Part I, will be published in August.—THE EDITORS.

Is Your Refrigerating Equipment Too Small?

By R. T. BRIZZOLARA
Advisory Engineer, New York

Close examination should be made of an existing refrigerating installation before deciding that it is inadequate to meet today's heavier demands. Such investigation will often be rewarded by increased output and reduced operating cost, with little or no additional investment

MANY plants in the food industries will find their refrigeration problems becoming more acute as the war goes on. Heavier demands upon existing facilities, combined with the difficulty or impossibility of obtaining additional equipment, will make many food plants "scratch gravel" with their present set-ups.

This situation has its compensations. Long delayed but needed investigations of existing equipment will be made, now that the easy way of buying more new equipment is not available. Such an investigation seldom fails to disclose the fact that the refrigerating equipment is not being used to full capacity. This is more particularly true of older installations and those utilized in commercial duty. There are several reasons for this. First, in most of these food plants, the refrigeration involved was a minor consideration in the operation of the plant as a whole. The refrigerating equipment was increased from time to time as the plant's output increased, with little attention to a sound, planned balance.

Another factor is that refrigerating equipment often received the minimum of maintenance, as long as it functioned in a fair fashion. Also, the equipment was frequently purchased in a fiercely competitive atmosphere, with wide claims and counter-claims made by the sellers. As a result, the purchasers frequently bought a name and guarantee of performance, with no other check on the installation except that it operated and yielded a temperature.

In the older and larger plants, it is frequently found that rated capacities are extremely conservative. This was the equipment manufacturer's insurance, a means of discounting factors incidental to operation when projected into the future, such as uncertainty as to loads, wear and tear, maintenance and changing conditions. Study of these older systems usually discloses that even minor changes, made in the light of today's knowledge, will release considerable additional capacity. Much old equipment now thought obsolete will, when properly handled, be found to be on an operational par with more modern equipment.

Old compressor equipment, operating on ammonia, was bulky, operated at slow speed and was of large bore and stroke. These compressors were heavy and frequently were operated by steam or belted motor drive. However, aside from being cumbersome and often restricted in valve areas, they will perform, on the whole, as well as modern units.

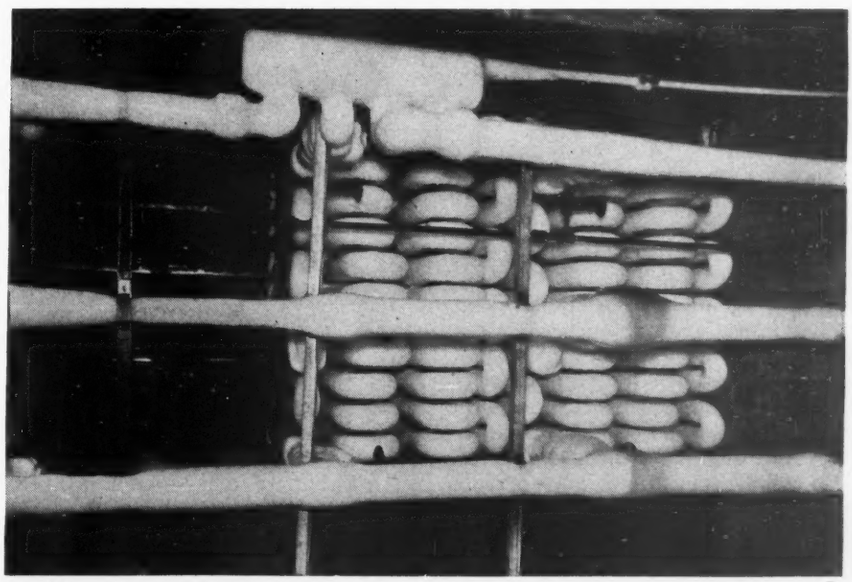
These heavily built units took much unwarranted abuse and were given inadequate maintenance. Their performance under these conditions is a revelation though, handicapped as they usually were with associated equipment in the system, they rarely developed their ultimate capacity. Thus, erroneous impressions were created as to the efficiency of this old equipment.

Associated condensing systems of double pipe and atmospheric condensers used with these older systems were handicaps, as compared to modern systems, only when they embodied notional piping arrangements and water distributing schemes. When simplified, they are functionally in every way equal in performance to modern equipment of the shell-and-tube types. Aside from possibly greater maintenance and space requirements, they can be relied upon with confidence. As they are constructed of ordinary pipe, and resort can be had to welding, repairs are less involved with them when the time to secure necessary materials arises.

Poorly designed or arranged evaporating surfaces or coils are among the greatest causes restricting maximum output. It has always been less costly to provide large compressors and drives than to furnish adequate "low sides" or evaporating surfaces. In this matter of better balancing of the "high" and "low sides," considerable extra refrigerating capacity can be picked up.

Improper handling of evaporating surfaces seriously restricts output. Excessive flooding of these surfaces to the point where wet vapors return to the compressor not only endangers the equipment, but also seriously reduces capacity. At the other extreme, in-

(Turn to page 107)



Expansion coils of ammonia system used in a meat plant. Because of increased demands on food plant refrigerating equipment and the difficulty of obtaining additional facilities, existing refrigerating systems should be examined as outlined in this article with a view to getting increased output.

Precision Instruments Speed Quality Control

By J. K. Cameron, K. G. Dykstra and J. E. Fix

Research Department, American Can Co., Maywood, Ill.

Comparative study of methods for determining sweet corn maturity shows value of refractometer and new semi-automatic moisture tester. These instruments are not so dependent upon the human factor as is the thumbnail test, and they are rapid

MATURITY has long been recognized as an important factor in the canning of corn. The stage of maturity at which corn is harvested determines, to a large extent, the tenderness, flavor and general quality of the canned product. At present, two methods are generally used for the estimation of maturity: (1) The thumbnail test, the oldest and most widely applied; and (2) the more recently employed moisture determination. Other methods, such as the determination of the refractive index of kernel fluids, or gravity-separation procedures, have been mentioned in the literature, but little or no data are available on their practical application.

Until recently, of the various moisture methods available, the Brown-Duvel technic was the one found to have most practical application in canneries for estimating the maturity of corn. This technic found application because of: (1) Its simplicity, (2) low cost of necessary equipment, and (3) the limited amount of experience required on the part of the operator. Although the method is more rapid than conventional laboratory moisture methods, its value as a criterion of maturity in corn is still limited by the time required for the determination.

Recently a rapid, semi-automatic moisture tester of the forced-draft type, manufactured by the Brabender Corp., Rochelle Park, N. J., has been given limited trials in the industry. This apparatus is rapid and is capable of drying ten samples at a time. Although the initial cost of the unit is relatively greater when compared with a single Brown-Duvel unit, the cost of the apparatus becomes more comparable when several Brown-Duvel units are required for the cannery control laboratory. In addition, the instrument requires no more operating skill than is required by the Brown-Duvel method.

The work reported herein covers an investigation of the semi-automatic moisture tester and the moisture determination by the Brown-Duvel apparatus as compared with maturity estimation by the thumbnail test. In addition, data were obtained on the use of refractive-index and gravity-separation tests as indices of maturity.

Experimental

The facilities of a large Midwest corn plant were made available for the project. All maturity tests were made at the cannery in 1941, and subsequent grading tests of the canned samples were conducted in this laboratory. Special apparatus necessary for the investigation was made available through the cooperation of laboratory and canning-machinery suppliers.

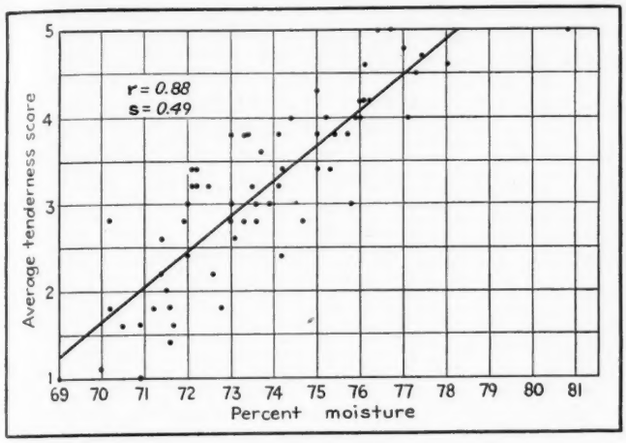
Time limited the varieties of corn investigated to one, namely, Country Gentleman. Admittedly, the use of two or more varieties would have been desirable, but since the investigation was designed to compare methods rather than to indicate standards for the estimation of maturity, the use of only one variety should not detract from the applicability of the results obtained.

Preparation of a sample for test consisted in the husking by hand of approximately 40 lb. of ears taken without selection from a load of corn as it was received at the cannery. The "yardman's grade" was given the sample by the yardman and was based on the thumbnail test. All usable ears were passed through a rotary head cutter equipped with cream-style scrapers. The kernels and scrapings so obtained were well mixed, and a uniform representative sample of about 2 lb. was removed and ground thoroughly in a laboratory blender. The resulting ground sample was comparatively homogeneous, as indicated by the fact that duplicate moisture determinations made by the semi-automatic moisture tester on samples so prepared differed by no more than 0.2 percent throughout the entire investigation.

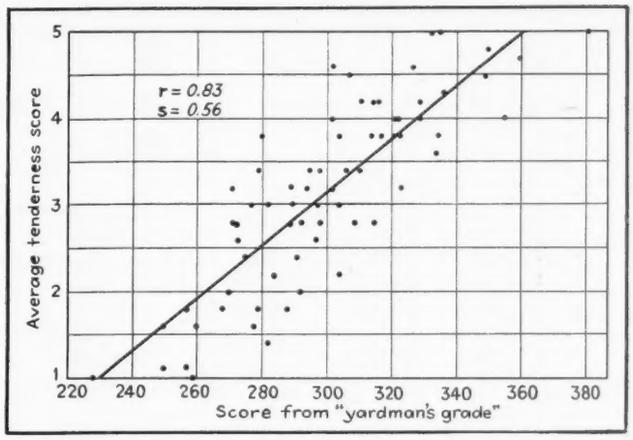
Determinations of moisture, using the conventional Brown-Duvel apparatus, were made on 20-gram duplicates of the ground sample according to usual practice. Moisture determinations, using the semi-automatic moisture tester, were made on 10-gram duplicates of the ground sample and were dried to constant weight at 110 deg. C. Refractive indices were determined on the juice obtained by filtering a portion of the ground sample through Kleenex tissue. An Abbé type refractometer was employed and the average of four readings on each sample was determined.

Gravity separation tests were made on all the remaining whole kernels. The kernels were washed to separate them from the scrapings and to remove foreign material, were drained on a screen, and were then placed in a 65-deg. salometer salt solution. The percent by weight of the kernels which floated was determined. The kernels were then rinsed to remove the salt and were brine packed for subsequent grading purposes.

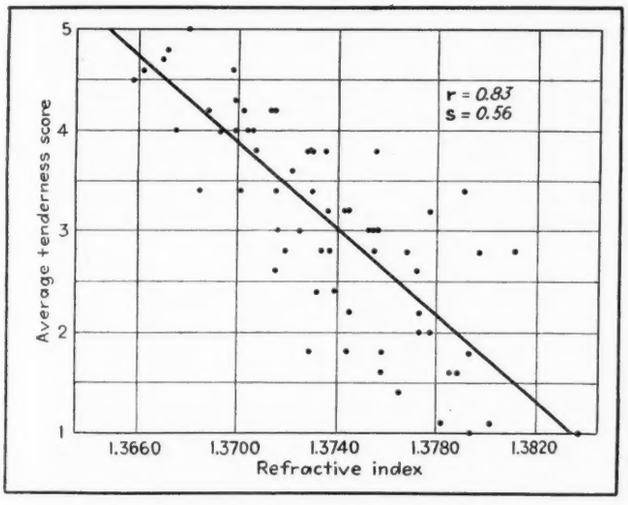
Because of the large number of canned samples enployed in the investigation, use of a simplified method in grading for quality was necessary. Since tenderness is the most important factor to be considered in the grading of whole-grain corn and is closely associated with maturity and other qualities,



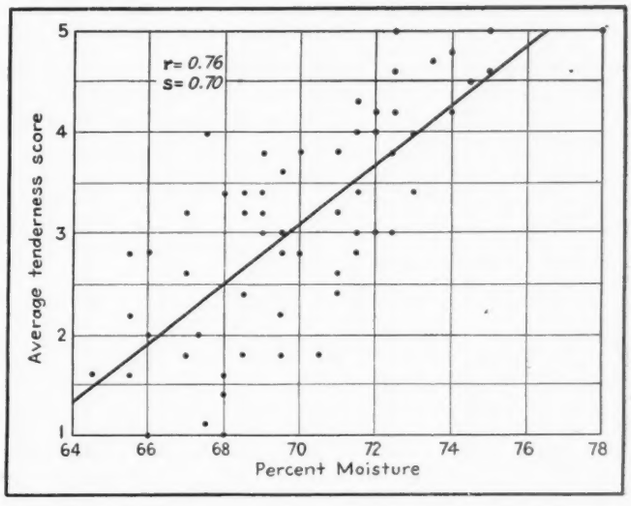
(a) Moisture (by semi-automatic tester) vs. tenderness score.



(b) "Yardman's grade" vs. average tenderness score.



(c) Refractive index vs. average tenderness score.



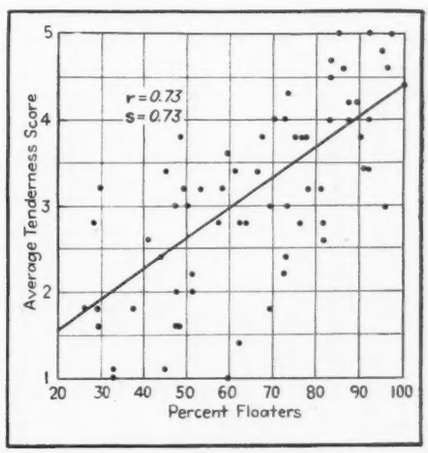
(d) Moisture (by Brown-Duvel method) vs. tenderness score.

Fig. 1. Regression curves show relation between investigated methods of maturity estimation and the average of tenderness scores assigned to canned samples by experienced graders.

this factor was chosen as the basis for the quality grade.

Sixty-eight lots of corn were sampled during the investigation. The canned samples were stored for several months and then were graded independently by representatives of several large corn canners and by several members of this department. Each grader, working independently, tasted each sample of corn, scored it mainly on the basis of tenderness, and assigned the customary trade terminology of fancy, extra standard, standard and intermediate designations. For convenience, these grade designations were converted to a numerical system on a scale of 1 to 5, the toughest samples being given a rating of 1 and the most tender samples being scored 5. When the gradings had been completed, the numerical ratings of individual graders were averaged for each sample of corn. The resulting average numerical scores for tenderness were used for correlation with the values obtained by the various maturity tests. Some differences of opinion as to trade grades were found among individual graders. However, for purposes of discussion only, the samples may be considered to range from standard to fancy quality. The numerical tenderness scores of 1, 3 and 5 would therefore be equivalent to the trade grades of standard, extra standard and fancy, respectively.

The values obtained by all the maturity tests employed are plotted against average numerical score in the graphs of Fig. 1. Correlation coefficient (r) and standard error of estimate (s) have been calculated for each maturity test and are shown on each graph of Fig. 1. The error of estimate of each test may be easily visualized by reference to Fig. 2. For example, the graph shows 40 samples in the first block of the chart for error of estimate in the moisture test data determined with the semi-automatic apparatus. This means that the maturity of the corn of these samples was determined by this test within plus or minus 0.4 numerical score points of the average numerical score given by the graders. Similarly,



(e) Gravity separation vs. average tenderness score.

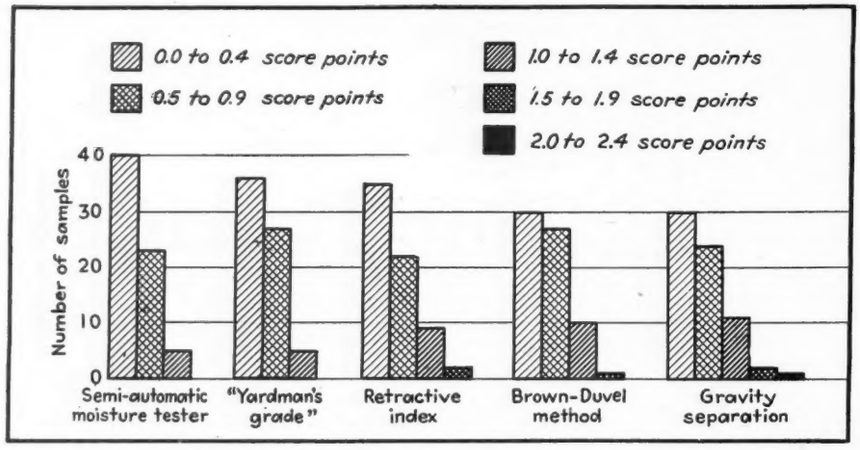


Fig. 2. Graptical summary of distribution of errors of estimate in terms of score points on numerical tenderness scale.

the second block of this same chart, representing errors of estimate between 0.5 and 0.9 numerical score points, shows that 23 samples differed from the graders score by not less than 0.5 of a score point, nor more than 0.9 of a score point.

Discussion

All maturity tests investigated showed a significant correlation with the average numerical score determined organoleptically. On the basis of the correlation coefficients, the efficiency of the maturity tests fell in the following order: (1) Semi-automatic moisture test, 0.88; (2) "yardman's grade" and refractive index, equivalent values, 0.83; (3) Brown-Duvel moisture test, 0.76; and (4) gravity test, 0.73. The comparative accuracy, speed and general applicability of the various tests are discussed below under separate headings in the order of their correlation coefficients.

Semi-automatic Moisture Tester

As mentioned previously, all moisture determinations with the semi-automatic testing apparatus were made by drying the corn to constant temperature at 110 deg. C. Obviously, this procedure is too slow for practical use. Consequently, a more rapid technic employing the apparatus was sought. Moisture determinations made at 175, 150, 125, and 105 deg. C. were compared for samples of corn at various stages of maturity. Curves showing the results obtained from these tests are given in Fig. 3. These curves show that considerable decomposition takes place at the higher temperatures and that the degree of decomposition appears to be related to the maturity of the corn. Because of this relationship, decompotion should not have any detrimental effect on the value of the test. In fact, it may be advantageous. Further examination of the curves shows that after 35 minutes at 175 deg. C. and 40 minutes at 150 deg. C., the curves level off and the only further change taking place consists of a slow loss resulting from decomposition. The data obtained from the six samples run showed duplicates dried 35 minutes at 175 deg. C. to differ by a maximum of 0.1 percent moisture. Duplicates dried at 150 deg. C. for 40 minutes showed a maximum difference of 0.3 percent moisture. These differences are comparatively small, and single samples, instead of duplicates, could be run with no great loss in accuracy.

Since the rapid moisture tester dries ten samples at a time, reduction of the drying time to an average of 3½ to 4 minutes per sample would be possible by eliminating duplicates, using a high drying temperature and preparing the ground sample as described previously. However, the over-all drying time will be 35 to 40 minutes, and the moisture content of any one sample cannot be determined in a shorter time.

Reference to Fig. 2 shows that five samples were found to have a maximum error of estimate of from 1.0 to 1.4 numerical scores. This error of estimate would be equivalent to estimating the grade of these samples as standard when the actual grade given would be between standard and extra standard, a relatively small error.

In addition to being rapid and accurate, the semi-automatic moisture tester was found to be generally more convenient to handle than the Brown-Duvel apparatus. The machine was easy to operate, the technic was simple, and once the samples were placed in the oven the operator was left free to perform other work until the samples were ready to be weighed.

"Yardman's Grade"

The "yardman's grade" was determined by means of the thumbnail test, which is well known to corn canners. This test, when plotted against the tenderness scores, gave a somewhat lower correlation coefficient, 0.83, than did the rapid semi-automatic moisture tester values when compared on the

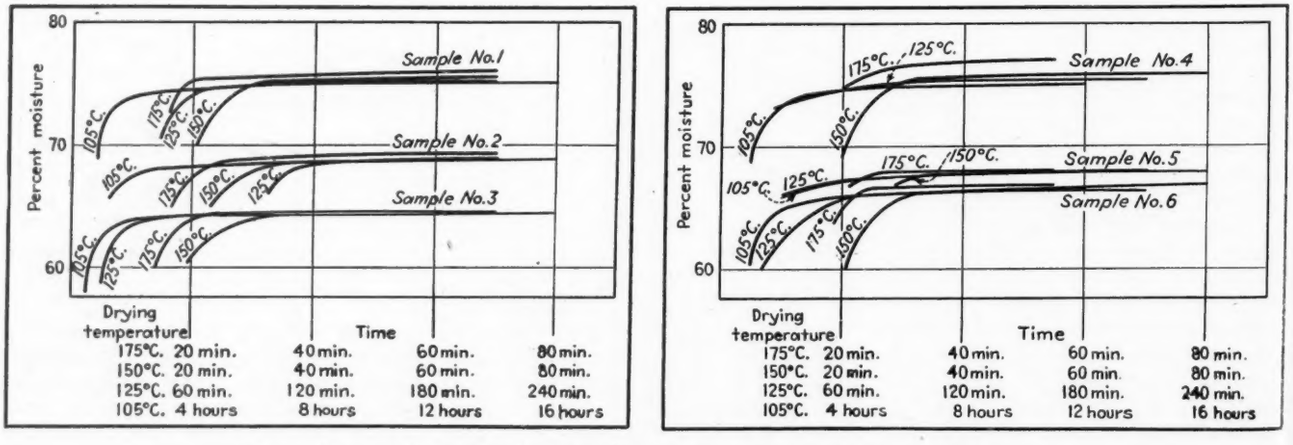


Fig. 3. Moisture (weight loss) curves obtained by drying six samples of raw sweet corn of varying maturity at several temperatures in semi-automatic moisture tester.

same basis. As shown in Fig. 2, the maximum error was the same as that for the semi-automatic tester.

These data would tend to show—especially when the speed and ease with which the test is performed are considered—the "yardman's test" to be nearly as satisfactory as the rapid moisture tester method. On the other hand, considerable differences are known to exist between the results obtained by different yardmen.[1] Grades given by individual yardmen are not comparable and interchangeable, but rather, in interpreting and utilizing the results, allowances must be made for personal differences. Furthermore, it is possible that the results of an individual yardman may change from year to year, and standards of maturity based on his grade may have to be altered correspondingly. Consequently, results obtained by physical or chemical laboratory tests are more readily reproducible.

Refractive Index

The determination of the refractive index of the kernel fluids gave as high a correlation coefficient as did the "yardman's grade." However, from Fig. 2, it may be seen that two samples gave a maximum error of estimate of from 1.5 to 1.9 numerical scores, somewhat higher than that of both semi-automatic moisture and "yardman's grade." The two samples showing this degree of error of estimate might, for example, be estimated as having a grade of standard quality when the actual grade of the samples would be extra standard.

The determination of refractive index was found to be the most rapid method investigated. It is a matter of but a few moments to smear the prisms and to make a reading. Furthermore, the results of a determination on any one sample are made available in but a few minutes, as compared with the 35 to 40 minutes required to dry a sample with the most rapid moisture method studied. The colloidal nature of the kernel fluids produces a more or less indistinct line when viewed through the

(*Turn to page* 113)

How To Prevent and Remove Milk Deposits*

By LEWIS SHERE

Vice-president in Charge of Research, Diversey Corp., Chicago, Ill.

PART II—Consistent attention to proper cleaning routine, involving the use of suitable milkstone removing products and effective cleaning solutions, combined with the use of softening agents for hard water, if present, will remove milkstone deposits and prevent their subsequent deposition.**

LET us first consider the steps which are necessary to prevent milkstone, or better, to minimize milkstone as much as possible.

Rinsing the equipment with fresh, cold water right after handling the milk is undoubtedly the first step in minimizing milkstone formation.

This is particularly true with equipment which has been used for handling heated milk products. Cold water should be used, as it is most effective in soaking and softening up the contamination and is better than warm or hot water. Further, as the cold rinse water drains from the equipment, the equipment is left cold so that any milk deposit left on the equipment will have less tendency to dry on and make the removal more difficult.

Thorough, everyday cleaning is also necessary in minimizing milkstone formation. For this operation cleaners should be selected which have adequate and proper water softening properties to take care of hard-water salts and they should also possess free and rapid rinsing action. If the cleaning solution tends to produce film or scale deposits on the equipment, then the equipment is more likely to become coated with milkstone the next time the milk is processed. The cleaning solution should be completely rinsed from the equipment, using, this time, hot water so that the surface will be left dry until it is ready to be used again for handling milk.

Chlorine Sterilizers

For sterilizng the equipment, chlorine sterilizers have a definite advantage over heat methods in minimizing milkstone formations. A chlorine sterilizer of the proper type will admittedly soften the water so that freedom from film and scale deposits, as in the case of proper cleaning solutions, is assured.

Heat sterilization, on the other hand, particularly when hot water is used, is likely to cause a drying on of the hard-water salts, which may provide the foundation for objectionable milkstone contamination.

Another important factor having to do with the control of milkstone is the selection and use of cleaners, sterilizers and other materials which do not corrode or damage the equipment. A corroded surface when examined under the microscope is observed to be a roughened, irregular surface. Such surfaces cause solid matter to become lodged on the equipment surface, where it remains and provides the starting point for milkstone deposits. A smooth polished surface under identical conditions will be much freer of milkstone than a roughened or corroded surface. It is, therefore, important to keep the equipment clean and keep it smooth and bright and shiny by the use of proper cleaners and sterilizers. Harsh abrasive materials, indiscriminately em-

The "coin test" consists of scraping the sides of the wet vat lightly with a penny. It reveals the presence or absence of milkstone.

* Based on a paper presented on January 5, 1942, in the Dairy Industry Short Course, University of California, Davis, Calif.

** Part I of this paper was published in FOOD INDUSTRIES, June 1942.

ployed, may damage the surface so that more milkstone is produced the next time the equipment is used.

These constitute the more important steps in minimizing milkstone formation on dairy equipment. There are, of course, other precautionary steps which should be taken, but which, in most cases, constitute good pasteurizing practice. Further, many of these steps are peculiar to the set-up and equipment at each individual plant and, therefore, would necessitate specific recommendations.

Removal of Deposits

The second step in the control of milkstone is the removal of milk deposits and other contamination present. This can generally be considered on the basis of two conditions:

1. Where the contamination present is the result of inefficient or improper methods in the past. Such contamination is most likely to be an accumulation of milkstone which has been built up over a period of several weeks or months.

2. The type of milkstone that is formed every day because of the tremendous quantities of milk heated or cooled over a limited area of equipment.

The removal of the first type of milkstone will generally be most effectively accomplished with a product which is acid in nature. In order to accomplish effective results, the product must possess effective penetrating, wetting and suspending action, as well as proper milkstone solvent action. There are several good products of this sort on the market and the manufacturer's recommendations should be followed closely for best results. The normal procedure is to circulate the solution of the milkstone remover over the contaminated area anywhere from 20 minutes to 3 hours at a temperature of 135 deg. F. to the maximum temperature of 165 deg. F. The equipment is then rinsed and brushed thoroughly. This treatment will both soften up and dissolve the milkstone so that complete removal is accomplished in the final brushing operation.

There are also effective products available which can be used in a paste form. These are particularly adapted to cleaning large surfaces, such as exist in tanks, where the quantity of solution required for soaking would be excessive and uneconomical. Such products are brushed on as a thick paste or cream, allowed to stand for 20 minutes or 30 minutes, and the operation then completed with further brushing and rinsing.

The paste or cream method of removing milkstone is also ideally suited to the treatment of utensils on the dairy farm where, through neglect in the past, the utensils have become coated with a film or scale which is not removed as part of the daily regular cleaning operations. The paste may be prepared in a crock or saucer, then brushed on to the utensils and allowed to stand for 10 or 15 minutes. Subsequent brushing and rinsing completely remove the contamination, leaving the utensils in a condition where they can be easily and effectively sterilized.

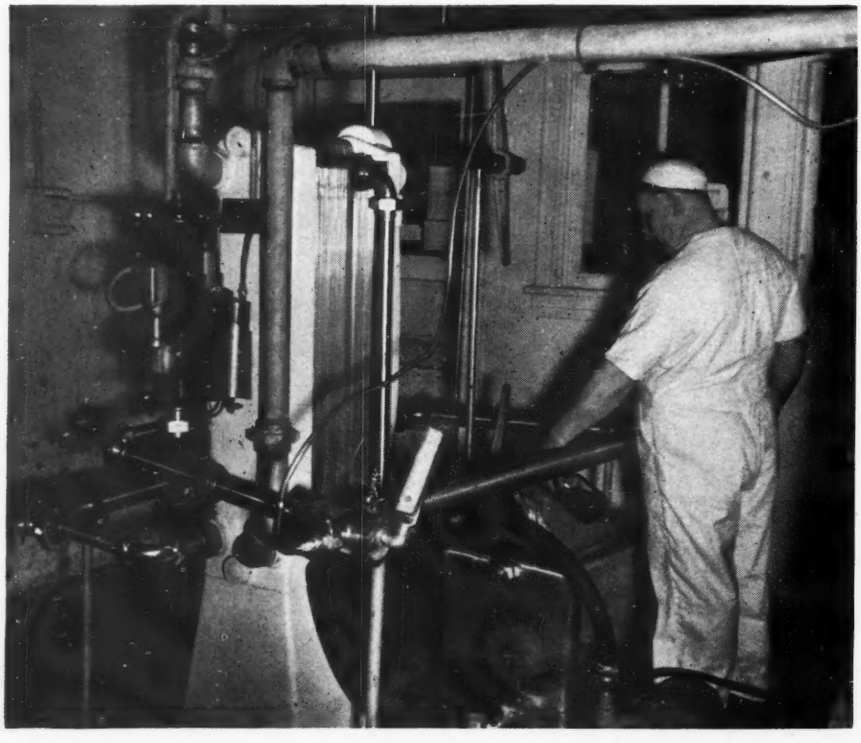
The removal of the second type of milkstone can generally be accomplished by the use of specially prepared milkstone removers which may be either acid or alkaline in reaction. The application of such products in general follows the same procedure as mentioned previously, with the exception that when alkaline solutions are used the temperature is usually raised to between 163 and 183 deg. F. The exact nature of the milkstone present, the condition of the equipment, and similar specific factors differ in each plant and should be considered in selecting the best treatment available.

Plate Type Equipment

Where very large quantities of milk are handled in plate-type and tubular pasteurizers, particularly when the short-time method is used, a somewhat different type of milkstone is usually encountered at the end of each day's run. Such milkstone contamination is best handled, usually, by a double treatment. This can be done by first circulating a specially designed milkstone remover which is acid in reaction. Then, after rinsing, circulate a solution of alkaline milkstone remover.

Daily accumulations of milkstone formations which are encountered on plate-type heat exchange units appear to be largely a casein salt, probably calcium caseinate, which is not readily soluble in alkaline solutions. By treatment with an effective milkstone remover which is acid in reaction, the calcium salts are decomposed, leaving casein in a swelled condition, the calcium becoming a soluble salt in the acid solution. The swelled casein and other organic matter will then be readily soluble in an alkaline milkstone-removing solution. Cleaning with an alkaline type of milkstone remover alone is not as effective as the combination treatment and leaves a mineral deposit after repeated cleaning. This deposit later shows up as a white film.

The removal of milkstone from plate-type heat-exchange units by the combination treatment consists in first treating with a solution of milkstone remover having a pH of approximately 2.0 to 2.5, and following with an alkaline removing solution. Treatment with the first milkstone-removing solution leaves the milkstone apparently un-



In milkstone control for a plate-type short-time pasteurizer, the milkstone remover is added to water in the balance tank and the solution is then circulated through the unit.

changed, although it has evidently been softened. The milkstone is then rinsed and the alkaline type of milkstone-removing solution is then circulated, the result being that a perfectly clean surface is obtained without the aid of any brushing or mechanical treatment.

When the above procedure was reversed, it was observed that after circulating the alkaline type of milkstone-removing solution the milkstone was soft and partially removed. Following this with a solution of acid-type milkstone remover did not improve the removal of the milkstone in any manner. This shows the importance of using the dual treatment where this particular type of milkstone contamination is encountered.

Treating Milk Cans

One type of utensil which receives probably more than its proper share of milkstone or milk deposits is the milk can. All too often we see milk cans which have become coated with objectionable milkstone deposits, particularly on the interior surface. There is probably no more prolific source of thermophilic and thermoduric bacteria in a milk supply than cans which are coated with milkstone. It is, therefore, very important that we give proper attention to the treatment of milk cans in order to insure that they will be in sanitary condition when received by the dairy producer. With our present knowledge of dairy engineering and chemistry, it is possible today to produce milk cans which are clean, sweet smelling, effectively sterilized and free from any objectionable film or milkstone contamination.

Where cans have already become coated with milkstone, steps should be taken to remove the present accumulation by the use of an effective milkstone remover. This might be done by treating the cans with a solution of the proper milkstone remover or by either soaking the cans in a tank or filling the cans and allowing them to soak with the milkstone-removing solution. Usually a soak of 10 to 20 minutes is necessary to completely remove all the milkstone accumulation.

Another method of treating the milk cans is by the use of the type of milkstone removers which may be used in the form of a cream or paste. This cream or paste can be applied to the complete interior of the can and allowed to remain on the surface of the cans for 10 or 15 minutes to soften up and dissolve the milkstone. Then the cans should be thoroughly brushed, and rinsed and all traces of milkstone accumulations will be removed. The cans should then be run through the can washer in the regular manner to assure their being effectively sterilized.

Following the circulation of the milkstone remover solution in the plate-type short-time pasteurizer, the plates are separated and inspected. Only an occasional plate needs any brushing.

It is not possible to overemphasize the importance of keeping milk cans free from milkstone to prevent high bacterial counts and particularly to insure that the cans will not be a source of a high thermoduric or thermophilic bacteria count. Keeping the cans in a condition free from milkstone, and proper cooperation with the milk producers to aid them in keeping their utensils free from milkstone, will do much to improve the quality of the incoming milk supply.

The "Coin Test"

It is not always wise to pat yourself on the back if the equipment looks bright and shiny after the milkstone-remover treatment. This is especially true if your observations of the results are made when the equipment is still wet. You often cannot see the milkstone on most dairy equipment when it is still wet, and you have to wait until the equipment is absolutely dry before you can determine the efficiency of the milkstone-removal job. You can, however, take a coin or your fingernail and lightly scrape the side of the vat or tank and get a good idea as to whether or not all the milkstone has been taken off. I generally use a penny because it is the one coin I can almost always count on having. It won't scratch or hurt the equipment and the dark-colored background makes it possible to see the scrapings. If some of the milkstone contamination is still left on the equipment, you will sometimes find that the scrapings will chip off like paint or varnish. This generally indicates a milkstone that is high in organic matter. Where the scrapings are finely pulverized, the chances are that the milkstone is high in mineral content. This, of course, is not a sure test insofar as the composition of the milkstone is concerned, but it is a good test to make to see whether or not milkstone is on the equipment and also a good test after the treatment is completed to determine the thoroughness of removal.

In selecting a milkstone remover, care should be exercised to make sure that one is used that does not injure or damage the equipment. There are, for example, any number of raw chemicals or materials which will dissolve or act upon the contamination and which, at the same time, will also damage or corrode the surface of the equipment. With products of this sort, it would be possible to do more damage to the equipment through corroding it than would result from leaving the

milkstone on the equipment. This would be another case of "the operation was a success but the patient died." Reputable manufacturers of dairy cleaners have developed products which not only remove the milkstone successfully, but are, at the same time, safe to use and do not corrode or damage the equipment itself. Such products also have proper rinsing, water-softening, penetrating and wetting action and other characteristics so that no bad after-effects result from their proper application, but all the benefits of an effective milkstone-removal job are obtained.

Brief Summaries Of AMS Standards

For the convenience of those who control quality in the food industries, the following digests have been prepared of the standards issued by the Agricultural Marketing Service

ABSTRACTS containing the principal requirements of the standards issued by the Agricultural Marketing Service of the U. S. Department of Agriculture are prepared by FOOD INDUSTRIES. Those that follow and those which appeared in the August, September, October and November, 1941, issues are a continuation of the series begun in 1940.

The complete text of the standards can be obtained from the AMS, located in Washington, D. C.

Canned Grapefruit Juice

CANNED GRAPEFRUIT JUICE is composed of the unfermented juice obtained from properly matured fresh fruit which has first been properly washed, may be packed with or without the addition of sugar, and is sufficiently pasteurized to assure preservation of the product in hermetically sealed containers.

U. S. GRADE A or U. S. FANCY canned grapefruit juice possesses the color of fresh pressed juice, not darker than Plate 10, G-1, as illustrated in Maerz and Paul's "Dictionary of Color." * The juice is practically free from defects, containing not more than 10 percent free and suspended pulp when determined according to the method outlined herein. The juice tests not less than 9.5 deg. Brix if unsweetened and not less than 13.5 deg. Brix if sweetened; contains not less than 1.0 percent nor more than 1.7 percent acid calculated as anhydrous citric acid, except that the juice may contain up to 1.9 percent citric acid, provided the juice has been packed from fruit meeting the maturity requirements of the State in which the fruit was grown; contains not more than 0.014 percent by volume of recoverable oil; possesses a fine grapefruit flavor; and scores not less than 90 points when scored according to the scoring system outlined herein.

U. S. GRADE C or U. S. STANDARD canned grapefruit juice possesses a good color which may have a slight amber tinge but is not darker than Citron Yellow, Plate 10, J-2, as illustrated in Maerz and Paul's "Dictionary of Color." * The juice is reasonably free from defects, containing not more than 15 percent free and suspended pulp. The juice tests not less than 9.5 deg. Brix if unsweetened and not less than 13.5 deg. Brix if sweetened; contains not less than 0.8 percent nor more than 2.0 percent acid calculated as anhydrous citric acid; contains not more than 0.020 percent by volume of recoverable oil; possesses a normal canned grapefruit juice flavor; and scores not less than 70 points.

OFF-GRADE canned grapefruit juice is grapefruit juice that fails to meet the requirements of U. S. GRADE C or U. S. STANDARD.

Containers of grapefruit juice shall be packed as full as possible without impairment of quality and shall be certified as "Below Standard in Fill" if the product occupies less than 90 percent of the volume capacity of the container.

The grade of canned grapefruit juice may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (35 points), absence of defects (35 points) and flavor (30 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

When grapefruit juice is packed from fruit commonly known to the trade as "pink fruit," the factor of color may be scored in Grade A classification, provided the color is not darker than Plate 10, H-2. When the color is darker than Plate 10, H-2, but not darker than Plate 10, H-4, the juice shall not be graded above U. S. GRADE C or U. S. STANDARD, regardless of the total score for the product.

If the juice is off-color or is darker than Plate 10, J-2, or Plate 10, H-4, it shall not be graded above OFF-GRADE, regardless of the total score for the product.

The factor of absence of defects deals principally with workmanship. The presence of particles of membrane, core, skin, seeds, "rag" or other residue is to be reflected in the scoring of this factor. The factor relating to flavor and aroma of canned grapefruit juice shall be classified from the standpoint of palatability.

If the State maturity requirements are not met, certificates of grade shall bear the following legend: "Grade not certified account failure meet maturity requirements of State of ——."

The percentage of free and suspended pulp and the "percent by volume of recoverable oil" in grapefruit juice are determined by methods outlined in detail in the standards.

"Acid" in grapefruit juice is determined by titration with standard sodium hydroxide solution, using phenolphthalein as indicator. Acid is calculated as anhydrous citric acid.

ISSUED: November 26, 1941.
EFFECTIVE: December 15, 1941.

Frozen Corn

(Tentative)

FROZEN CORN is prepared from the immature grains of sweet corn by removing from the cob and is frozen and stored at temperatures necessary for the preservation of the product.

U. S. GRADE A or U. S. FANCY frozen corn has similar varietal characteristics; possesses a practically uniform characteristic color, contains no foreign material, may contain not more than 2 percent by count of major defects nor more than 25 percent by count of minor defects, is tender and sweet and scores not less than 85 points.

U. S. GRADE B or U. S. EXTRA STANDARD frozen corn has similar

* See *Food Industries*, November, 1939, pages 619-624.

varietal characteristics, possesses a reasonably uniform characteristic color, contains no foreign material, may contain not more than 4 percent by count of major defects nor more than 50 percent by count of minor defects, is reasonably tender and reasonably sweet and scores not less than 70 points.

OFF-GRADE frozen corn is corn that fails to meet the requirements of U. S. GRADE B OR U. S. EXTRA STANDARD.

The grade of frozen corn is determined immediately after the corn has reached 68 deg. F. in air at room temperature.

The grade of frozen corn may be ascertained by considering the following factors: Color (15 points), absence of defects (25 points), tenderness and maturity (25 points) and sweetness (35 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

Silks, portions of husk and tough cob tissues are included with the count of kernels in determining the percentage by count of defects. "Major defects" are silks, portions of husk, tough cob tissue (whether or not attached to a kernel of corn) and kernels damaged by unsightly discoloration, worm, insect or any other serious injury. "Minor defects" are crushed kernels, kernels that possess slight dark spots, kernels that have lost a major portion or all of the endosperm and portions of kernels of which one-third or less of the kernel is present.

The brine test for maturity shall be made on the thawed corn, with all defects removed, in salt solution at 68 deg. F., at a depth of 2 in.

A method of determining percentage of sugar is explained in the standards.

When certifying samples which have been officially drawn and which represent a specific lot of frozen corn, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug and Cosmetic Act.

ISSUED: March 10, 1942
EFFECTIVE: April 1, 1942

Frozen Asparagus

(Tentative)

FROZEN ASPARAGUS is prepared from fresh units by proper trimming and thorough washing and is frozen and stored at temperatures necessary for the preservation of the product.

Frozen asparagus may be any of the following styles:

Spears or *Stalks* (head and adjoining portions of stalks not less than 3¾ in. in length and usually not longer than 6 in.).

Tips (same as *Spears*, between 3¾ and 2¾ in. in length).

Points (same as *Spears*, less than 2¾ in. in length).

Cuts (cut portions of asparagus which contain not less than 15 percent by count of heads).

Bottom Cuts (less than 15 percent by count of heads).

U. S. GRADE A or U. S. FANCY frozen asparagus possesses a practically uniform, typical green color. The units are not less than ⅜ in. in diameter (No. 2 size), are practically uniform in size, are well trimmed, well formed and are practically free from defects. The product possesses a normal flavor and odor and scores not less than 85 points when scored according to the scoring system. *Cut* asparagus of this grade shall contain not less than 25 percent by count of heads nor more than 5 percent by count of pieces less than ¾ in. in length. *Bottom Cuts* asparagus of this grade may contain less than 15 percent by count of heads but not more than 5 percent by count of pieces less than ¾ in. in length.

U. S. GRADE 2B of U. S. EXTRA STANDARD frozen asparagus possesses a reasonably uniform, typical green color. The units are not less than ⅜ in. in diameter (No. 2 size), are reasonably uniform in size, are well trimmed, are fairly well formed and are reasonably free from defects. The product possesses a normal flavor and odor and scores not less than 70 points. *Cut* asparagus of this grade shall contain not less than 15 percent by count of heads nor more than 5 percent by count of pieces less than ¾ in. in length. *Bottom Cuts* asparagus of this grade may contain less than 15 percent by count of heads but not more than 5 percent by count of pieces less than ¾ in. in length.

OFF-GRADE frozen asparagus is asparagus that fails to meet the requirements of U. S. GRADE B or U. S. EXTRA STANDARD.

Official inspection certificates for *Spears* or *Stalks*, *Tips*, and *Points* will indicate the size or combination of sizes found upon examination. The various sizes of frozen asparagus are as follows: Size 1 (small) are less than ⅜ in. in diameter, Size 2 (medium) ⅜ to ⅝ in. Size 3 (large) ⅝ to ⅞ in. and Size 4 (extra large) ⅞ in. or larger. The diameter is the greatest thickness of the unit measured at a point 5 in. from the top, except that units less than 5 in. in length are measured at the base.

The grade of frozen asparagus is determined after the asparagus has been thawed sufficiently under a gentle spray of tap water so that each unit is free from ice crystals and can be handled individually. After the asparagus has been scored for all factors it is placed in boiling water in an uncovered container. The cooking time (from the time the water boils after the asparagus is added) in six minutes for size No. 1, nine minutes for size No. 2, and twelve minutes for size No. 3 and size No. 4.

The grade of frozen asparagus may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (30 points), uniformity of size (20 points) and absence of defects (50 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

The factor of absence of defects has reference to the degree of freedom from grit, crooked units, poorly trimmed units, open heads, flowered heads, shattered heads and units damaged by spots, stain discoloration and mechanical, pathological or insect injury.

"Well trimmed means that the butt of the stalk is smoothly cut at approximately right angles to the longitudinal axis and is not stringy or frayed. "Grit" (or sand) is rough, hard particles of earthy sediment. "Open heads" are asparagus heads in which the florets have begun to flower or have started to spread from the stalk. "Flowered heads" are asparagus heads in which the florets are in the flowered stage. "Shattered heads" are asparagus heads that have been broken or shattered by mechanical or other means. "Normal flavor and odor" means that the asparagus, after cooking, is free from objectionable

flavor or odor of any kind.

When certifying samples which have been officially drawn and which represent a specific lot of frozen asparagus, the grade will be determined by averaging the score of all containers, provided not more than one-sixth of the containers fail in some respect to meet the requirements of the grade indicated by the average score.

However, none of the containers may fall more than 4 points below the minimum score for the grade indicated by the average score, and if one-sixth or less of the containers fail to meet the requirements of the indicated grade by reason of a limiting rule, the average score of all containers for the limiting factor must be within the range for the grade indicated by the average total score.

This tolerance does not apply if any container falls below any applicable standard of quality promulgated under the Federal Food, Drug and Cosmetic Act.

ISSUED: March 10, 1942
EFFECTIVE: April 1, 1942

Canned Fruits for Salad

(Tentative)

CANNED FRUITS for salad consist of the varieties of fruit in the proportions listed in Table No. I. The product may be packed in water, sirup, or fruit juices, and is sufficiently processed by heat to assure preservation of the product in hermetically sealed containers.

U. S. GRADE A or U. S. FANCY canned fruits for salad consist of fruits that possess a reasonably good color, practically free from staining from artificial dye when artificially colored fruits are present. The units of each fruit are practically uniform in size, are practically free from defects, are tender and of good texture and possess a normal flavor. The product scores not less than 85 points when scored according to the scoring system.

U. S. GRADE B or U. S. CHOICE canned fruits for salad consist of fruits that possess a fairly good color, practically free from staining from artificial dye when artificially colored fruits are present. The units of each fruit are reasonably uniform in size, are fairly free from defects, are reasonably tender and possess a reasonably good texture and possess a normal flavor. The product scores not less than 70 points.

OFF-GRADE canned fruits for salad are canned fruits for salad that fail to meet the requirements of U. S. GRADE B or U. S. CHOICE.

Canned fruits for salad shall contain fruits in the proportions indicated in Table I which is given below.

TABLE I.

Fruit	Style	Proportion (Based on drained weight) Not less than	Not more than
Yellow cling peaches	Peeled (halved, quartered, or sliced)	24%	40%
Apricots	Peeled or unpeeled (halved)	18%	30%
Pears	Peeled and cored (halved, quartered or sliced)	21%	35%
Pineapple	Wedge-shaped segments	8%	16%
Cherries or Grapes	Maraschino type or natural whole, pitted cherries	3%	8%
	Whole natural or artificially colored grapes	3%	8%

Canned fruits for salad are usually packed in sirup. Sirup "cut-out" requirements, however, are not incorporated in the grades of the finished product, as sirup, as such, is not a factor of quality for the product of these grades. Canned fruits for salad will be certified as to grade without regard to sirup density, but in each instance official inspection certificates will bear a notation in connection with the grade statement indicating the density of the sirup *found upon examination*. For this purpose, "Extra Heavy Sirup" means that the sirup tests 22 deg. Brix or over; "Heavy Sirup" means that the sirup tests 18 deg. to 22 deg. Brix; "Light Sirup" means that the sirup tests 14 deg. to 18 deg. Brix; "Water, Slightly Sweetened" means that the sirup tests less than 14 deg. Brix; and "Water Pack" means that the product is packed in water.

The container shall be filled with fruits for salad as full as practicable without impairment of quality. The product and packing medium shall occupy not less than 90 percent of the total volume capacity of the container. The recommended minimum drained weights in the cans commonly used in packing canned fruits for salad are shown in a table in the standards.

When certifying samples which have been officially drawn from lots of fruits for salad, compliance of the entire sample with recommended minimum drained weights will be determined by averaging the drained weights of all containers in the sample, provided the range of variability is within the limits of good packing practice. If the average thus obtained is not less than the recommended drained weight, the entire sample will be certified as meeting the minimum drained weight recommended. Except as provided above, cans of fruit for salad that fall below the recommended minimum drained weight will be certified with the additional statement, "Below recommended minimum drained weight."

The grade of canned fruits for salad may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (25 points), uniformity of size (25 points), absence of defects (25 points) and character of fruit (25 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor type are so described that the value may be ascertained for each factor and expressed numerically.

To receive the highest rating under the factor of uniformity of size, each fruit present must be practically uniform in size and each separate fruit for which U. S. standards for grades have been issued must conform to the requirements of U. S. GRADE A for the factor of uniformity of size under the respective standards. The fruit must also be packed in such a manner as to give a definite number of servings, each of which contains at least one piece of each fruit. The number of servings may vary from lot to lot but must be uniform for each lot examined. In order to allow for a normal variation in size of the pieces an addition of one piece of one or two fruits may be allowed. If the number of pieces of each fruit does not comply with these requirements, the product shall not be graded above U. S. GRADE B or U. S. CHOICE, and the statement of grade will be qualified by the statement, "Irregular Counts." The number of servings packed in the various size cans normally used for this product are shown in another table in the standards.

The factor of absence of defects has reference to the degree of freedom from seed cells, peel, hard calyx tissue and fruit damaged by spotted or discolored areas, oxidation and sluffing of peaches and pears; spotted, crushed or discolored apricots; badly frayed segments of pineapple; crushed or spotted cherries, and other pathological, mechanical or insect injury.

The factor of character of fruit has reference to the tenderness and texture expected in properly matured fruit of the varieties present.

"Normal flavor" means that the product is free from objectionable or off flavors of all kinds. Other terms are explained in the section entitled "Ascertaining the Rating of Each Factor."

When certifying samples which have been officially drawn and which represent a specific lot of canned fruits for salad, the grade will be determined by averaging the score of all of the containers.

ISSUED: Feb. 24, 1942
EFFECTIVE: April 1, 1942

Use of Soya Lecithin Will Save Scarce Fats

By JOSEPH STANLEY
American Lecithin Co., Inc., Elmhurst, N. Y.

This ingredient will also extend the stability of fats, will reduce the amount of egg yolk required in ice cream, will stabilize vitamin A potency and extend vitamin B_1 activity, and can be employed to cut costs and improve quality in the confectionery, baking and ice cream industries

BECAUSE of economic dislocations arising from the present world war, soya lecithin is acquiring an increased importance in improving the quality, extending the period of stability, and cutting the costs of foodstuffs. Foods containing fats, egg yolks and vitamins A and B_1 are particularly affected. Savings of important fats may be had by using lecithin in the confectionery, chocolate, biscuit and bread making industries. The period of stability of the edible fats themselves may be lengthened for long storage or export by a trace of soya lecithin. In products such as ice cream, the supply of egg yolk can be extended effectively by a mixture of lecithin and glyceryl monostearate.[1] German military emergency rations contain lecithin.[2]

Utilization of all grades of flour in macaroni products is possible by inclusion of 1 percent of lecithin. Stabilization of vitamin A potency and extension of vitamin B_1 activity are also accomplished by adding soya lecithin. Because of their excellent properties, vitamin-fortified mixtures of lecithin-containing margarine and dairy butter are popular in Europe, even in peacetime.

As known commercially, soya lecithin, or simply "lecithin," is the phosphatide constituent of the soy bean. It serves as an excellent interface agent (a reducer of friction or attraction between particles) in food mixtures, and as an antioxidant. Most prepared foods are randon or unorganized systems of water- and fat-containing constituents, often in the finely divided or collodial state. Most frequently we encounter a glyceride intermixed with protein or carbohydrate matter in varying degrees of dispersion, with or without water. In such foods, lecithin shows its colloidal properties at the contact points of the suspension or mixture. When lecithin is dispersed in these foods its molecules proceed at once to the fat-water interfaces, arrange themselves in an orderly single-molecule layer, and greatly change the properties and quality of the finished food.

The lecithin commonly used is extracted from soybeans grown in the United States. There has been a steady increase in the soybean crop until now it exceeds 100,000,000 bu., and a steady decrease in the price of lecithin until now it is available at very reasonable cost for almost any industrial use. Purified hexane is used to extract the lecithin and oil from soybeans. During recovery the solvent is then distilled off from the extract, leaving a residue of lecithin suspended in oil. The lecithin is separated from the main body of the oil by hydration with steam and subsequent centrifuging. The lecithin emulsion as separated is then dried under vacuum at low temperatures.

This commercial product contains roughly equal proportions of lecithin, cephalin and soya oil, with small amounts of sterols and inositol. Sometimes the soya oil is removed by selective extraction with acetone, and replaced with another oil or a fat such as cocoa butter. This adsorbed oil or carrier serves to render the product indefinitely nonputrifying and readily dispersible.

Characteristics

Lecithin is a bright light-brown, soft, salve-like substance of neutral odor and bland taste. It can be bleached to a faint golden tint. At about 150 deg. F. it melts to an oil which disperses readily in warm glyceride oils. In the melted state it takes up limited percentages of alcohol, glycerol and other solvents to form combinations which remain fluid at room temperature. Commercial lecithin is only partly soluble in alcohol, but completely soluble in all aliphatic and aromatic hydrocarbons. With water it readily forms emulsions which can be diluted indefinitely.

Chemically, lecithin may be visual-

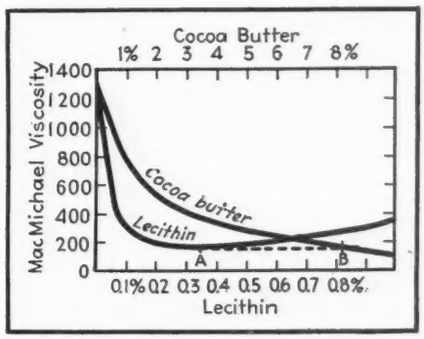


Fig. 1. Relative effect of lecithin and cocoa butter on viscosity of dark chocolate. (A) Most effective percentage of lecithin, 0.35 percent. (B) Percentage of cocoa butter, approximately 8 percent, required to give same viscosity as addition of 0.35 percent lecithin.

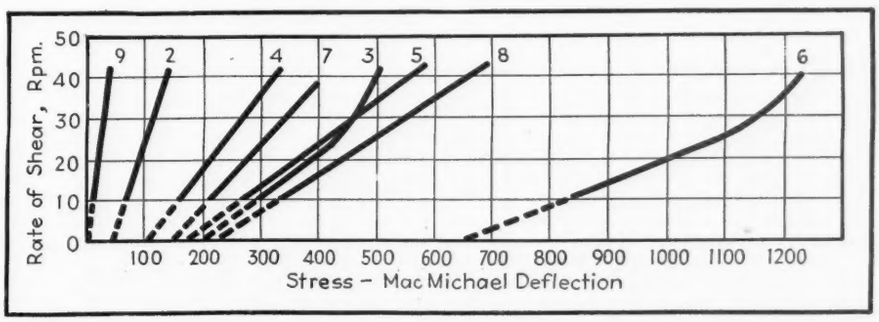


Fig. 2. Viscosity curves of typical chocolate products.[4] (2) Chocolate liquor. (3) Dark chocolate. (4) Light sweet chocolate. (5) Milk chocolate, 12 percent milk solids. (6) Milk chocolate, 18 percent milk solids, no lecithin. (7) Milk chocolate, 18 percent milk solids, with lecithin. (8) Buttermilk chocolate. (9) Ice cream coating.

ized as a diglyceride, esterfied in turn to phosphoric acid and choline. The related and associated phosphatide, cephalin, has the same structure except that it contains ethanolamine in place of choline. The molecular structure of both lecithin and cephalin discloses a strongly lipophylic fatty acid group at one end of the molecule, and a strongly hydrophylic amine group at the opposite end. This naturally balanced antipolar configuration confers the interface properties by which a great many of its industrial applications are explained. When dispersed in any heterogeneous system, such as chocolate, margarine or ice cream, the phosphatides are visualized as forming a layer one molecule deep at the interface between the hetereogeneous constituents, with the fatty acid part of the molecules facing the lipophyle surface, and the amine part facing the hydrophyle surface. The practical result of adding a few tenths of a percent of lecithin to these foods appears magical. In the case of chocolate, a thick mud-like mass liquefies into a thin liquid almost instantly. With margarine, superior emulsion results in a product of increased utility for culinary purposes and for baking. Ice cream using high serum solids, in which lecithin effectively prevents crystallization of lactose, becomes a velvety smooth product, free of sandiness.

The antioxidant properties of lecithin are commonly ascribed to the amine and phosphoric acid parts of the molecule. Of course, lecithin has the obvious advantage of being a natural, innocuous and thoroughly nutritious antioxident for use in foods.

In itself, soya lecithin is a concentrated and valuable food occurring widely. The most important and vital organs and fluids of the vegetable and animal kingdoms contain lecithin or its associated phosphatides, and its presence adds to their dietetic value. Thus we find lecithin in meat, brains, nerves, blood and dairy products, as well as in all seeds, beans, nuts and grains.

If the lipids of foods containing only traces of oil are analyzed, they will be found to consist largely of lecithin and its associated phosphatides. In such low-fat foods we find the phosphatides generally complexed at interfaces with carbohydrates, proteins or compounds of silicon. Such a situation exists in flour, starch and skim milk, and in the foods manufactured from these. Let it not be assumed, however, that lecithin serves no function in these foods. For example, removal of the lecithin from gluten by ether extraction causes the gluten to lose its identity and degenerate into a useless crumbly mass. Its characteristic properties are restored by restoring the lecithin. For this reason one need not be surprised to learn that soya lecithin improves baked goods and macaroni. They depend largely on proper gluten functioning for quality.

Applications

When examining the interfacial and colloidal behavior of any system constituting a food, with a view of utilizing the advantages of adding soya lecithin, one can well bear in mind the chemical, physical, colloidal, antioxidant and physiological properties of soya lecithin as summarized.

Specific applications of soya lecithin in the food industries have been the subject of much study and many patent applications. In dispersions of finely divided material in a fat like chocolate, cocoa coatings, ice cream coatings[3] and wafer fillings, lecithin acts primarily as an edible wetting agent. By using lecithin, these products can be manufactured to the same fluidity with a much less oil or fat content. A flavorful undiluted food is thus produced with savings in labor, power, time and money. When lecithin serves as a wetting agent, most benefit is obtained when the interfaces or meeting points of the heterogeneous constituents are covered with an antipolar layer one molecule deep. Because of this fact the theoretical percentage of lecithin required is calculable from molecular constants. Depending on fineness, this optimal percentage generally figures out between 0.1 and 1 percent. This calculated percentage range checks with experience. This behavior shows another advantage of lecithin in that its benefits can be generally obtained by using only a few tenths of a percent in the finished food. Indeed, percentages beyond these low optimums may cause a reverse effect, as shown in Fig. 1.

Confectionery

In a heterogeneous system like chocolate, uniform wetting of the hydrophylic disperse phase results in colloidal stability. Recently the beneficial effect of lecithin in chocolate has been studied by mechanically measuring the plasticity or change in viscosity.[4] Cocoa butter, lecithin, moisture, air, milk solids, fineness, temperatures and processing have been shown to be among the factors influencing the plastic behavior of chocolate.

Besides stabilizing the chocolate, saving cocoa butter, and counteracting the thickening effect of moisture, lecithin protects colloidal dispersion, especially of milk chocolate, in the melted or overheated state (Table II). Viscosity curves also show how the lecithin counteracts gumminess and improves coverage of chocolate coating (Fig. 2). Chocolate stabilized with lecithin has been found to have a readily controllable temper when properly heat conditioned for enrobing. By widening the enrobing temperature range, and controlling undesirable crystallization of the higher melting glycerides with lecithin, production of chocolate goods of unusual stability, smoothness, luster and resistance to bloom at lower cost has been found possible.

Oil-containing confections like caramels and nougats are made essentially by boiling a sugar sirup with a fat. In such products, lecithin acts as a high-temperature emulsifying agent, causing rapid dispersion of the fat in the hot sirup. The result is a smooth, uniform, creamy confection. At the same time lecithin counteracts greasiness, graining and staling, to give a longer shelf life. This application of lecithin is im-

TABLE I — Effect of Heat on Viscosity of Chocolate Products as Measured by MacMichael Viscosimeter.

Sample No.	Kind	Viscosity before heating	Viscosity after heating
1	Cocoa butter	1	1
2	Chocolate liquor	95	90
3	Dark chocolate	370	357
4	Light sweet chocolate	214	220
5	Milk chocolate, 12% milk solids	354	489
6	Milk chocolate, 18% milk solids, no lecithin	1004	1830
7	Milk chocolate, 18% milk solids, with lecithin	268	364
8	Buttermilk chocolate	438	789
9	Ice cream coating, 55% cocoa butter	12	12
10	Ice cream coating, 65% cocoa butter	5	5

TABLE III—Effect of Moisture on Viscosity of Chocolate Products.

Moisture (percent)	With 0.3% lecithin	With 6% cocoa butter
0.50	112	112
0.75	130	132
1.00	143	150
1.25	187	195
1.50	230	238
1.75	250	290
2.00	330	440

TABLE II—Effect of Temperature on Viscosity of Chocolate

Sample No.	Kind	95° F.	100° F.	105° F.	110° F.	120° F.	130° F.	140° F.	150° F.	160° F.
2	Chocolate liquor	101	95	88	80	69	61	54	48	42
3	Dark chocolate	390	370	356	340	318	298	281	265	249
4	Light sweet	227	214	206	199	189	188	190	197	209
5	Milk chocolate, 12% milk solids	370	354	349	347	355	414	....	....	....
6	Milk chocolate, 18% milk solids, no lecithin	1015	1004	1004	1025	1100	1195	1335	1530	....
7	Milk chocolate, 18% milk solids, with lecithin	281	268	260	251	239	231	232	242	264
8	Buttermilk chocolate	463	438	413	392	359	344	340	355	390

portant to the extent that some manufacturers of oils and fats for the confectionery trade incorporate lecithin into all their products.

Ice Cream and Margarine

Soya lecithin has a special stabilizing effect in ice cream.[5] It imparts a velvety smoothness, as well as improving body, melt-down and heat-shock characteristics. Lecithin may also show striking advantages when used in conjunction with other stabilizers, such as glyceryl monostearate. Above all, it prevents crystallization of lactose in high-serum-solids ice cream, and in that way eliminates the problem of disagreeable sandiness. Low-serum-solids ice cream has a biting, frigid taste because of its low melting point. Lecithin-containing high-serum-solids ice cream retains its smoothness with no sanding, even after storage and periodic heat-shocking for almost a year. This important use of soya lecithin furnishes a new avenue of disposition of fat-free milk solids at a reasonable price, which is important to our agricultural economy. This possibility is particularly important because of rising prices and shortages arising from war conditions.

Another essential application of soya lecithin is in the manufacture of margarine. In this industry lecithin completely displaced egg yolk many years ago because of its superior colloidal effects, stability against putrefication, and lower cost. Fractional percentages confer butter-like properties to margarine. A better intermixture of the various glycerides is also effected, producing a margarine of better appearance, texture and spreadability. In particular, lecithin-containing margarine does not spatter when used in frying, and gives a desirable brown, movable sediment which does not stick to the bottom of the pan. In addition, lecithin enhances the baking qualities of the fat, and owing to its antioxidant properties favorably affects the keeping qualities of margarine fortified with fish-liver-oil concentrates containing vitamins A and D.

Edible Fats and Macaroni

Since lecithin is a natural oil-soluble antixodiant* and emulsifier, it finds enthusiastic acceptance in edible fats and shortenings. As little as 0.05 percent can be used to counteract rancidity and hydrolysis in lard, oleo oil and compound shortening. During wartime its use in such fats is particularly recommended to stabilize them for long storage or export and to lessen other hazards. Higher percentages can be used in baking fats to increase their shortening and emulsifying effect in bread, cake and biscuit doughs.[7] The lecithin

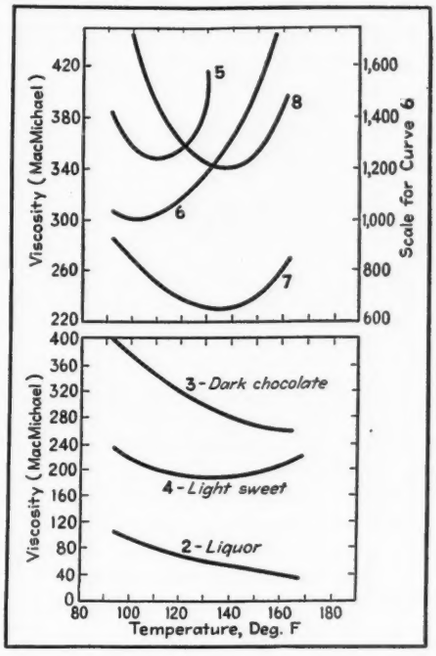


Fig. 3. Effect of temperature on viscosity of chocolate. Numbers on curves refer to Table II.

causes the shortening to spread rapidly and uniformly throughout the batch, promoting tenderness, moisture retention and even texture.

The advantages of soya lecithin in macaroni products are well known. A study of the gluten hydrogel formed on cooking macaroni reveals that lecithin is essential to its proper structure. The lecithin is adsorbed at the gluten interfaces (boundaries of the gluten particles), stabilizing the cooked macaroni to the extent of preventing syneresis or water separation.[8] Disintegration on prolonged cooking or canning is avoided by the use of soya lecithin.[9] The improving effect in macaroni is so great that the inclusion of 1 percent makes possible the manufacture from soft wheat flour of macaroni comparable in quality to that made from hard wheat flour.[10] In Germany, for example, where hard wheat for alimentary pastes must be imported, a decree of the government* legalizes soya lecithin in macaroni doughs in order to utilize domestically grown soft wheat.[11] Greater latitude in the selection of raw materials, especially the utilization of domestic raw materials, is of special importance during wartime.

Vitamin Fortification Problems

The role of lecithin in vitamin fortification is interesting. That soya lecithin stabilizes the potency of vitamin A preparations and concentrates because of its antioxidant effect has long been known.[12] Deficiency in choline causes derangements in fat metabolism giving rise to fatty livers. Choline is one of the few substances that furnish indispensable labile methyl groups.[13]

For these reasons Richardson[14] classifies choline among the accessory food factors of the vitamin B group. These accessory functions of choline are antagonized by cholesterol. Accordingly, soya lecithin is a good source of choline, because, unlike eggs, it contains no cholesterol. The naturally esterified choline in soya lecithin shows none of the undesirable after effects of synthetic choline. That increased metabolism or increased ingestion of thiamin requires additional choline has been shown.[15]

Unfortunately the over-refining of fats, sugars and flour has depleted our food of vitally necessary choline, as well as vitamins and minerals. Hence, fortification of food with thiamin should be accompanied by the addition of soya lecithin as well, to provide the cholesterol-free choline which makes the vitamin more effective.

Soya lecithin has heretofore been looked upon as a specialty ingredient. But because of the properties and proved applications of lecithin, and because of its availability, soya lecithin justifiably can be regarded as a commodity which may assume first-rank importance in the conservation of, and more effective use of, strategic materials such as fats and vitamins.

* D. R., Entwurf einer Verordnung über Teigwaren, Secs. 2 & 5.

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Uses Wooden Tires And Horse Wagons To Save Milk Routes

Beatrice Creamery Co. has converted 55 percent of its retail milk routes to horse wagons and is using wooden-block tires which last from eight months to a year

DEMOTORIZATION and the use of wooden tires on its horse wagons is the plan of the Beatrice Creamery Co. to save the retail milk routes of the company at its various plants throughout the United States. By July 1 the company expected to have 55 percent of its retail milk routes served by horse-drawn wagons. This ratio may be increased to 80 percent before the summer is over.

As the motor trucks of the company are withdrawn from service and laid up for the duration, the truck wheels and rubber tires will be removed and installed on the horse wagons. A rubber tire on a milk wagon, as pointed out by C. H. Haskell, president of the Beatrice company, will last twice as long as it will on a motor truck because the wagon speeds are slower, there is less loss of rubber in starting and stopping, and it is more difficult to overload.

Looking ahead, however, to the day when the company's available rubber tires are worn out, the company has begun to install wooden tires on its horse wagons. Wooden tires, such as shown in the accompanying illustrations, or improvements of such tires as determined by usage, will become standard equipment on the Beatrice wagons as the delivery equipment is progressively changed over to meet the increasing rubber tire shortage.

Unless there is some major improvement in the rubber tire situation, it is anticipated that as the present tires wear out, they will be replaced until some 600 milk wagons will be using wooden tires on the Beatrice retail routes throughout the Middle West.

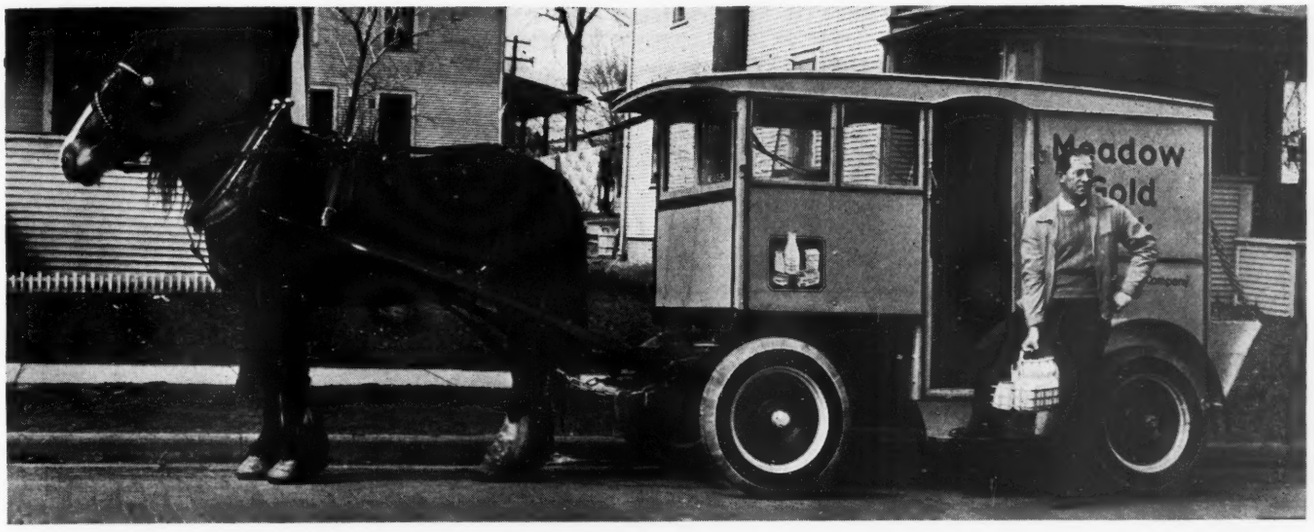
The first of the wooden tires were installed on one of the Beatrice company's horse wagons at its Waukegan, Ill., plant in the last week of February, and are still giving satisfactory service. It is estimated that the life of the wooden tire will be from 8 months to 1 year, or equivalent to 8,000 to 10,000 miles in the type of service in which the Beatrice wagons are operated. The wooden tires are now being mounted as fast as they can be manufactured.

The first wooden tires were made in accordance with a Beatrice design by the Batavia Body Co., Batavia, Ill., working in conjunction with the Metzger Co., Grand Rapids, Mich., a long-time manufacturer of wooden wheels for hand trucks.

As shown in the accompanying close-up, the wooden tire is made up of a series of 40 blocks with a cross section like that of a double truncated cone, the top surface of which corresponds to the tread of a rubber tire. The bottom of the block is cut into a narrow wedge that fits into the rim channel of an ordinary truck wheel.

The blocks are bolted in place through plates which in turn are bolted to the rim of the wheel. The wheel

Close-up of one of the Beatrice Creamery Co.'s wooden tires showing the outside block-retaining plate. The outside ring of bolt heads indicates the means by which each of the 40 blocks is held between the inside and outside retaining plates. The inside circle of bolt heads indicates the means by which the retaining plates are fastened to the wheel rim. The complete wheel and tire is taken off by unscrewing the nuts on the six hub bolts.



One of the Beatrice Creamery Co.'s wooden-tired, drop-framed retail milk wagons as used by the Meadow Gold plant in Waukegan, Ill. Except for a little wider tread than that shown, the wooden tires pictured above will be standard equipment on 80 percent of the Beatrice Creamery retail delivery system throughout the United States. The wooden tires are expected to wear from 8 months to 1 year. They were tried on a motor truck, but the vibration was excessive.

is mounted on hub-flange bolts in same manner as a rubber-tired wheel. When assembled, each wooden tire is approximately the same size as the rubber tire on a typical truck of the Ford, Chevrolet, Dodge or G.M.C. type.

So far, the most satisfactory wood for the tire has been oil-soaked oak, although some experiments have been made with maple blocks to lessen the danger of splitting.

Before they are mounted on the rim, the blocks are soaked in hot linseed oil and paraffin at a high temperature for 16 hours. White lead is used to fill in the joints between the blocks when they are mounted.

Although it is reported that the first wooden tires cost $20 per wheel and that this cost could be reduced to $12 or $15 in quantity production, the Batavia Body Co. states that it is not net ready to announce them to the trade or to quote a definite price.

As to similar wooden tires for use on retail milk motor trucks, the Beatrice company tried one on a truck for a few miles and drove the truck up to a speed of 18 miles an hour. At that speed the vibration was excessive, and the company is of the opinion that such tires would not be satisfactory on trucks unless the vehicles were driven at a slow speed of, say, 10 miles an hour or less.

However, Dugan Brothers of New Jersey, Inc., Newark, N. J., operating a fleet of over 1,200 trucks in the baking industry, has been experimenting with a wooden tire for motor trucks. Further information on this tire will be presented in the automotive pages of a forthcoming issue of FOOD INDUSTRIES.

Pittsburgh Dairies Drop Sunday Delivery

Done to conserve the existing supply of rubber tires. Special deliveries and call-backs previously cut out and retail home deliveries put on daylight schedule

ALL Sunday milk deliveries in Pittsburgh were discontinued on Sunday, June 7, as a means to conserve the existing supply of rubber tires as long as possible.

Previously, as of Friday, May 15, all Pittsburgh retail home routes were put on a daylight schedule and special deliveries and call-backs eliminated as of the same date. All of these moves were city-wide by large and small dairies through cooperative action of the Greater Pittsburgh Milk Dealers Association.

All of these changes in delivery schedules were made to comply with General Order No. 6 of the Office of Defense Transportation in an attempt to reduce the total June, 1941, rubber tire mileage 25 percent as compared with June, 1940, over and above the mileage reduction secured by the elimination of special deliveries and call-backs.

The daylight delivery schedule was adopted to comply with that additional requirement of Order No. 6 of not making more than one delivery or stop on any one day to any one person. Obviously, it is not possible to make milk deliveries between midnight and 8:00 a.m. and make weekly collections during the same hours. Accordingly, with deliveries made during daylight hours, collections are made on one of the six day a week deliveries at the same time that the milk is left at the customer's home.

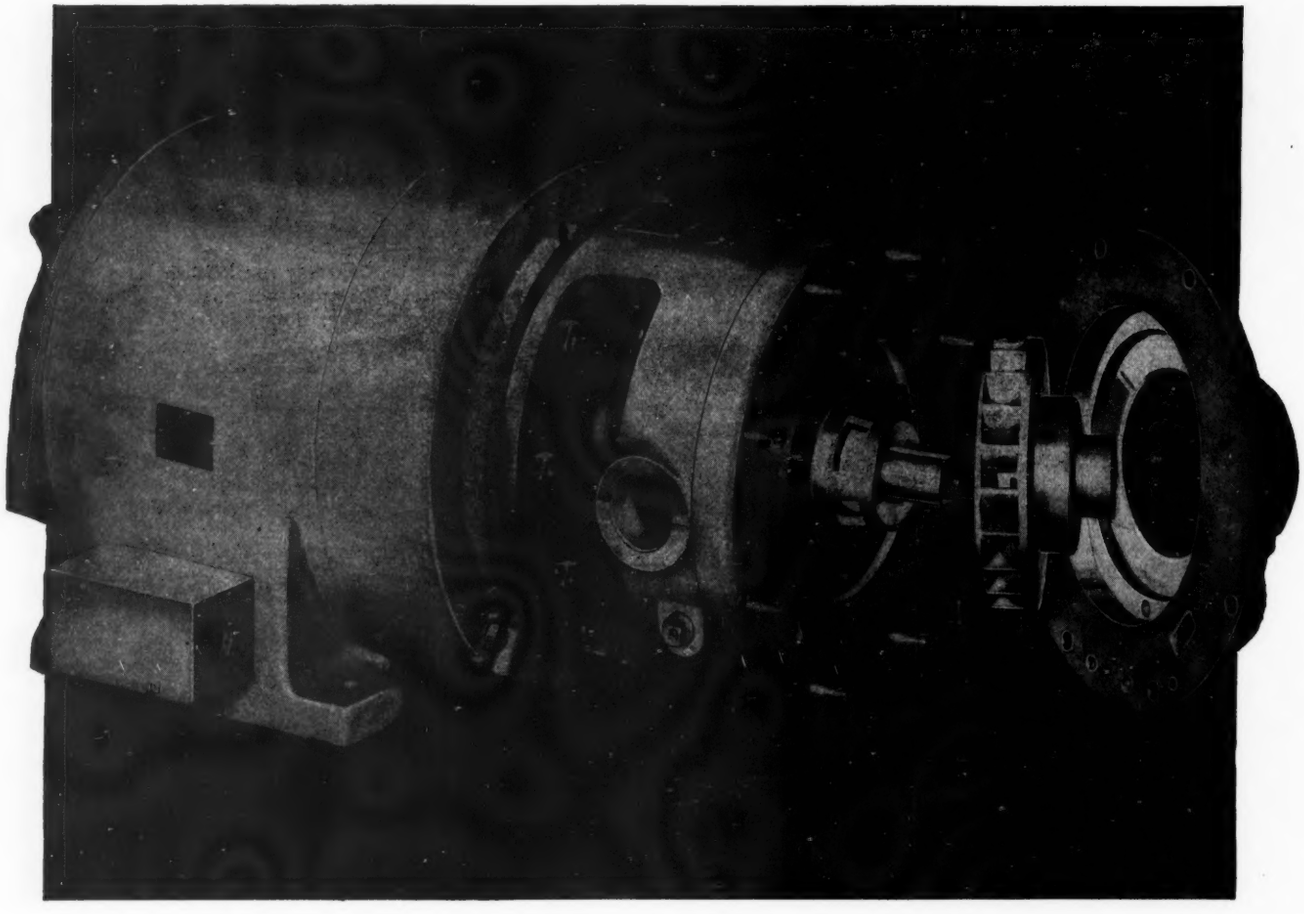
By making six instead of seven daily deliveries a week, it is expected that the delivery mileage will be reduced one-seventh, or 14.3 percent. This leaves an additional reduction of 10.7 percent in mileage to be obtained by other means now being worked out.

The above curtailed deliveries, worked out in cooperation with the Milk and Ice Cream Salesmen, Drivers and Dairy Employees Union, Local No. 205, A.F.L., were put into effect with but few inconveniences to the dairy customers, and even these will be eliminated when the schedule becomes an established routine.

NASH CLEAN-AIR COMPRESSORS

(TRADE MARK REG.)

are Long Life compressors, because they have no internal wearing parts



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

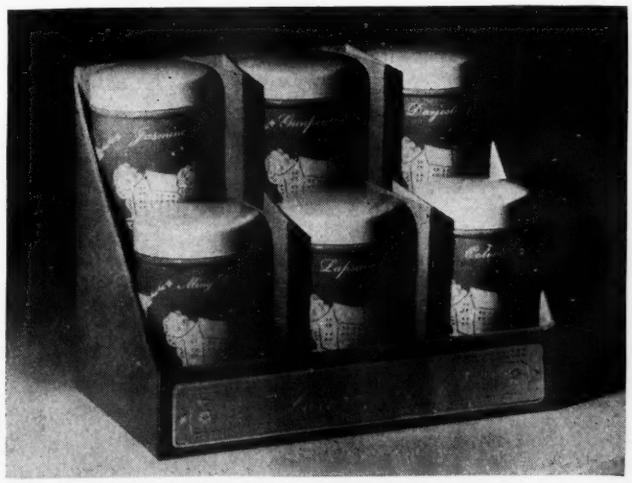
Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

220 WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS



Tea Till

Six varieties of choice teas have been collected by Stephen Leeman Products Corp., New City, N. Y., in a "Tea Till," complete with tea bags, and tacks with which to fasten the container to the kitchen wall. The "Teaberryport" products in the Till are Jasmine, Gunpowder, Darjeeling, Ming Cha, Lapsang and Oolong varieties, now particularly treasured by tea fanciers because of their scarcity. The 3-oz., rose-colored Tea Till with the small blue and white tins has a definite "quality" sales appeal to housewives.

The corporation also offers "Herb-A-Door," which, like the Tea Till, can be fastened on a convenient kitchen door. The package contains six tins of fragrant herbs, plus an herb chart.

Duff Changes Package

Duff's ginger bread mix and Duff's devil's food mix are now on the grocer's shelves in a new streamlined package designed by James Nash of New York, who also created the previous Duff metal foil package which won the All American Packaging Award in 1937. The new label uses a skillful combination of colors and an elongated double "ff" in the trade name, to give the package display value and sales appeal.

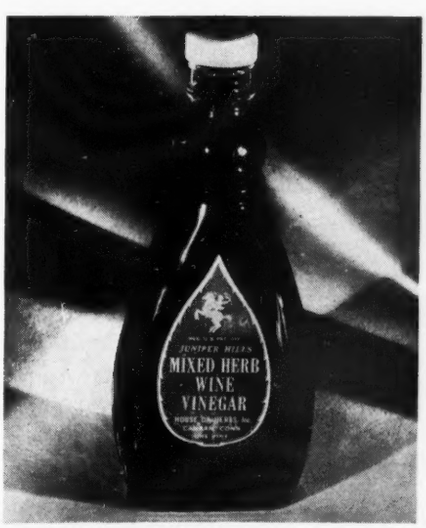
The new package is made of heavy chipboard with a laminated waxed paper lining and a waxed tight-wrap carrying the printed label design.

P. Duff & Sons, Inc., Pittsburgh, has improved its labels to meet war packaging demands and to keep them in step with the modern-type products they identify. The design of the label is such that the package would still be arresting if there should be a shortage of printing inks, and retail packages go into black and white for the duration. Duff submitted the proposed label to a jury of 500 women and grocers before adopting it. Their approval and the quick acceptance of brokers and sales representatives has led the company to use the new package for its entire line of products, two of which have been released. Shipping cases have also been redesigned with the same treatment.

Vinegar With A Difference

House of Herbs, Inc., Canaan, Conn., has added to its well-known line of sauces and seasonings a new mixed herb wine vinegar. Blended with olive oil, the product makes an unusual, savory dressing for vegetable salads and other dishes.

The fragrant, claret-colored wine vinegar is put up in 8-oz. and 1-pt. Duraglas bottles of striking design. New York stores are advertising the product as an interesting salad oil substitute for pure vinegar.



Chocolate Health-Bar

In line with the tremendous impetus in the sale of vitamin products during the past months is the appearance of a new chocolate bar, "Vi-Chocolin," manufactured by Vitamin-Erg Co., Inc., New York. The attractive, pleasant-tasting bar contains vitamins A, D, B_1, B_2 and C, in an amount equal to the daily requirements for adults.

The product is a blend of ingredients designed to help combat fatigue and build up resistance to colds and similar infections. These ingredients are: distillate of fish-liver oils, thiamin hydrochloride, riboflavin, ascorbic acid, vegetable lecithin, chocolate liquor, cane sugar, milk sugar and vanillin. The company suggests use of Vi-Chocolin as a supplement to the "between-meals snacks" provided by factory managements for the health of employees.

Vitamin-Erg Co., Inc., manufactures a similar chocolate bar, "Vit-A-Nite," containing vitamin A, useful in the treatment of nightblindness due to vitamin A deficiency.

It's time for MODERN Air Raid Protection!

WHEN it's open season for flies and mosquitoes, it's "A-penn" season! When squadrons of flying pests are nose-diving... or diving at your nose... then's the time to put A-penn Fly Spray into action.

A-penn will not only establish mastery of the air for your side... but it's as pleasantly perfumed as it is positive in action.

Crown Can supplies the A-penn Oil Company with the containers in which A-penn Fly Spray is packed . . . and they are cans designed to protect the contents as effectively as the contents protect the home from insect pests!

CROWN CAN COMPANY, PHILADELPHIA, PA., *Division of Crown Cork and Seal Company*

CROWN CAN

BALTIMORE • NEW YORK • ST. LOUIS • HOUSTON • MADISON • ORLANDO • FORT WAYNE • NEBRASKA CITY

FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • JULY, 1942

Egg Driers Cautioned About Quality Control

Emergency conference of industry held because egg powder is being rejected by the government

CALLED to press adoption of sound food processing practice, the War Emergency Conference of the egg drying industry dealt with shell egg selection and handling, plant practice and sanitation, dried egg quality and packaging problems. The conference, held in Chicago June 12 and 13 by the Agricultural Marketing Administration and the National Egg Producers Association, was called because egg powder is being rejected for Lease-Lend and Army purchases, and because the free fatty acid content of the powder is going up. Both the rejection of the powder and the free fatty acid increase indicate that the educational quality control program outlined at the Kansas City Feb. 28 conference is not being followed by all operators in the industry. Those who have adopted the recommended practice are not having any trouble.

Represented at the meeting were at least one individual from both the managerial and the production departments of all egg drying companies. Some of these operators are in the business without the approval of the AMS. No curbing action will be taken if high quality dried eggs are produced. But drastic curbing can be taken through the rejection of low-quality powder. Specifications are being set at such quality levels that careless operations can not meet them.

Col. Paul P. Logan, Quartermaster Corps, emphasized the importance of keeping dried egg quality high to assure ample supplies for the armed forces so that their fighting efficiency will be maintained. Army needs for 1942 were estimated at 18,000,000 lb. In absence of other acceptable packaging they are to be packed in hermetically sealed No. 10 tins, 3 lb. net weight. Packaging specifications are subject to change based on results obtained from experimental tests in progress.

Dewey Termohlen, AMS, denied that any price increase is in the offing. Only best quality eggs are to be packaged in 5-oz. consumer containers. When uniform, dependable extra-quality powder is available for these packages, premium price will be considered.

Harry E. Gorseline, Bureau of Food and Engineering Chemistry, outlined his work in 21 plants in 10 states involving 900 samples, and visits to 14 additional plants. His job is to discover where faulty practice lies and to determine what can be done to correct the trouble. His recommendation for an adequate quality control program includes: adequate refrigeration for both shell egg storage and production operations; sufficient and approved equipment; careful use of existing equipment; competent supervision of good sanitary practice.

C. E. Sidler, AMS field man, outlined a recommended program for plant operation during summer months. Biological aspects of the program involve combatting molds, foam control, bacteria and yeasts. Most important and effective in quality operation is intelligent application of refrigeration, with trained employees.

Reorganization of AMA was announced, with priorities being handled through J. W. Kinghorn, purchases through E. M. Norton, shipping instructions through T. T. Clifford, warehousing or storage through H. K. Osgood and production and quality control through Dewey Termohlen as coordinator and Charles Dominy as assistant coordinator.

Federal Inspection Of Meat Extended

MEAT PACKERS engaged only in intrastate business may now apply for Federal inspection under the provisions of a bill passed by Congress and signed by the President on June 10. If such packers expect to sell substantial quantities of meat to Federal agencies and if they meet the requirements for sanitation and acceptable equipment, they may receive Federal inspection and bid on Army, Navy and Lease-Lend contracts.

Patent Infringement Held

IN an opinion handed down on June 11 by the Federal District Court at Norfolk, Va., Procter & Gamble Co. was adjudged to be infringing upon a patent of Refining, Inc. The infringement is said to come through the use of continuous refining of vegetable oils, with centrifugal separation of the soap stock. The court's decision concluded the first phase of a three-year litigation.

Press Association

FOOD COMMITTEE HOLDS FIRST MEETING

This is the new War Food Requirements Committee, at its initial session in Washington on June 11. Left to right are John Orchard, representing Lease-Lend; Roland S. Vaile, Civilian Supply Division of WPB; L. S. Stinebower, State Department; Rear Admiral W. B. Young; Claude Wickard, Secretary of Agriculture and head of the food requirements committee; Brig. Gen. Carl A. Hardigo; W. B. Parker, Board of Economic Warfare; Douglas C. Townson, WPB Division of Industry Operation; and T. L. Danniels, WPB Materials Division.

Canned Foods Order Amended By WPB

Changes made in fruit and vegetable requirements; top grades given preference over can size

A NEW amendment to the Canned Foods Supplementary Order M-86-a, issued by WPB on May 25, made it clear that the grade preference of fruits and vegetables packed for military use and Lend-Lease during 1942 takes precedence over the can-size preference. The grade preferences vary among commodities but in most cases fancy, choice or extra standard grades are sought by government authorities. Under the Order, canners are required to set aside for the government a fixed percentage of the 1942 pack of various grades of 11 fruits and 12 vegetables, including fruit cocktail, peaches, California freestone peaches, pears, asparagus, lima beans, string beans, sweet corn, peas, tomatoes, tomato catsup, tomato juice apples, applesauce, apricots, RSP cherries, sweet cherries, pineapple, fresh prunes, beets, carrots, pumpkin and spinach.

Most of the fruits and vegetables are to be packed in No. 10 cans, to facilitate handling. Second can-size preference is usually the No. 2½ can, and third preference is the No. 2 can. But a packer who can pack, for example, either choice grade apricots in a No. 2½ can size, or top standard apricots in a No. 10 (first preference) can, is required to pack the choice grade in the No. 2½ can, giving precedence to the grade rather than can size.

Table I in the Supplementary Order applies to primary products: the quota of any product listed in Column A to be set aside by any canner for the government will be equal to the percentage shown in Column B applied to his total 1942 pack of that product.

Table II refers to secondary products; the use of tinplate in packing these products is restricted by Tinplate Conservation Order M-81 as it may be amended from time to time. The quota to be set aside for the government will be equal to the percentage shown in Column B applied to actual production as permitted by Order M-81 and such quotas may be packed in addition to the Pack limitation set by Order M-81.

Changes in description and grade preference were made for the following products in the amended Order: sweet cherries, pineapple, peas and tomatoes.

Specifications for Boxes

The amendment also included complete specifications for wooden containers. The canner is permitted to use as export boxes either nailed wooden boxes, weatherproof solid fiber boxes, or wire-bound wood boxes, according to certain regulations, except that nailed wooden boxes or weatherproof solid fiber boxes shall not be wired or strapped except as specifically directed by the purchaser.

Weatherproof solid fiber boxes must be of one-piece regular slotted construction, metal stitched body joint, constructed in accordance with detailed regulations given in the Order. Wirebound wood boxes must comply with Federal Specification No. NN-B-631a, with minor exceptions, and shall be made of veneer or sawed boards according to regulations. Nailed wooden boxes shall be made of new materials of good commercial quality and shall conform to WPB specifications for thickness.

Shortages Hit Candy Industry

Confectioners discuss substitutes for sugar; cocoa. Candy sales skyrocket in April

SUGAR SHORTAGE, increased scarcity of cocoa and other wartime problems of the candy industry were focal points of discussion at the National Confectioner's Association annual convention, June 8–11, in New York. Of immediate concern to the confectionery men is the shipping shortage which has depleted stocks of coconut oil and other ingredients. However, NCA speakers at the convention held hopes of replace-

TABLE I

A	B	C	D	E	F	G
Canned fruits and vegetables	Percentage of 1942 pack	Description	Can sizes preferred in order listed	Grade		
				First preference	Second preference	Third preference
Fruit cocktail	23	.....	10—2½—2	Choice	Fancy	
Peaches [2]	32	Clings-Freestone, halves-sliced.	10—2½—2	Choice	Top Standard Clings, only[1]	Fancy
Pears	31	Bartlett halves	10—2½—2	Choice	Top Std.[1]	Standard
Asparagus	30	Culturally bleached, all green.	10—2	Fancy Cut	Fancy Spear	
Beans, lima	25	Fresh	10—2	Ext. Std.	Fancy green	Std. fresh white
Beans, string	28	Cut-green, wax round, flat.	10—2	Ext. Std.	Top Std.[1]	Fancy
Corn, sweet	23	Yellow, white, cream style, whole kernel.	#2 Cream style & whole kernel #10 whole kernel only.	Ext. Std.	Fancy	Standard
Peas	26	Alaska's 3 & 4 sieve, Sweets-3 & larger, ungraded.	10—2	Ext. Std.	Top Std.[1]	Fancy
Tomatoes	33	.....	10—2½—2	Ext. Std.	Top Std.[1]	Fancy
Tomato catsup	23	.....	10—14 oz. glass & larger.	Fancy 25% solids.	Standard	
Tomato juice	15	.....	10—3 cyl. (404 x 700).	Fancy	.....	

[1] Top Standard means 70–74 inclusive as defined in terms of U. S. Grades.
[2] Except Freestone Peaches packed in California. (See table II.)

TABLE II

A	B	C	D	E	F	G
Canned fruits and vegetables	Percentage as defined above	Description	Can sizes preferred in order listed	Grade		
				First preference	Second preference	Third preference
Apples	58	Heavy pack	10	Standard	.....	
Applesauce	32	Fresh	10—2	Fancy	Standard	
Apricots	50	Halves unpeeled	10—2½	Choice	Top Std.[1]	Fancy
Cherries, RSP	21	Red pitted (water pack)	10—2	Standard	.....	
Cherries, sweet	34	Light, dark, pitted, unpitted.	10—2½—2	Choice	Top Std.[1]	Fancy
Peaches	26	Freestone (Calif. only) halves-sliced.	10—2½—2	Choice	Fancy	
Pineapple	26	Sliced, crushed, tidbits (except salad and cocktail tidbits), chunks.	10—2½—2	Fancy	Standard	
Prunes, fresh	25	Italian	10—2½	Choice	Fancy	
Beets	60	Cut-quartered-sliced-diced	10—2½—2	Fancy	Top Std.[2]	
Carrots	100	Diced	10—2½—2	Fancy	Top Std.[2]	
Pumpkin	65	.....	2½	Fancy	Top Std.[2]	
Spinach	58	.....	10—2½—2	Fancy	Top Std.[2]	

[1] Top Standard means 70–74 inclusive as defined in terms of U. S. Grades.
[2] Top Standard means 80–84 inclusive as defined in terms of U. S. Grades.

ment materials, such as more extensive use of molasses, corn products and foods containing natural sugar, to take the place of the cane sugar supply which has been reduced to 70 percent of the quantity received in April, 1941. Among exhibits at the convention were a sweet potato candy and another confection made from bread.

A tabulation of farm foods which showed the importance of the candy industry as an outlet for agricultural products revealed that 20 to 25 million dollars of dairy products were consumed last year by candy manufacturers. In addition domestic crops of nuts, sugar, corn products and honey were used to a greater extent than ever before. Conversion of food plants to war work was also discussed.

Philip P. Gott, president of the Association, said that sales of confectionery and chocolate products in the nation were up 36 percent during April, compared with the same month last year, but the increase will probably not continue in view of material shortages. Officers of the Association were reelected.

Bottle Crowns from Old Cans

As a possible solution to the bottle crown situation, Pepsi-Cola Co., Long Island City, N. Y., will attempt to stamp crowns out of old tin cans.

Frozen Pea Standards

A DRAFT of United States standards for grades of frozen peas has been developed by the Agricultural Marketing Administration, Washington, D. C. The standards were issued June 1, and are effective as of that date.

THE "THRIFTY LID"

Housewives can convert glass jars in which they buy vacuum-packed coffee into containers for home canning with the aid of the "thrifty lid." It is a composition-lined inner lid which is placed under the screw-cap which comes on the coffee jar.

FOOD and Civilian Morale
Packaging machinery plays a vital part

America is fed largely via the package . . . The food manufacturers' plants, the self-service markets and other retail outlets are all geared to package sales . . . Packaging, moreover, plays a vital part in preventing waste of vital food resources.

Maintaining efficiency in packaging equipment and machinery is therefore of utmost importance—in holding down costs, insuring steady, adequate output and thereby maintaining civilian morale.

Machines that "can take it"

Our machines in the field have proved that they have the strength and durability to withstand the extra load. Foresight in design has also provided these machines with the flexibility to accommodate changes in materials, sizes and types of wrapping.

And though our plant is giving first place to production of war equipment, our Designing and Engineering Department, Service Men and Sales Force are as available as ever. You can look to us with assurance that your present machines will be maintained at high efficiency.

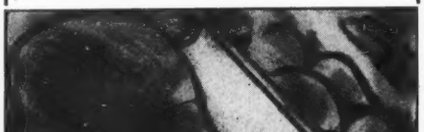
Should you require new machines to meet essential war or civilian needs, get in touch with us.

PACKAGE MACHINERY COMPANY
Springfield, Massachusetts

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO
Mexico: Agencia Comercial Anahuac, Apartado 2303, Mexico, D.F.
Argentina: David H. Orton, Maipu 231, Buenos Aires
England: Baker Perkins, Ltd., Peterborough
Australia: Baker Perkins, Pty., Ltd., Melbourne

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

STOP THAT WEEVIL!



IN plants where food is processed and stored, weevils and other destructive pests can be controlled by thorough fumigation with an effective fumigant such as HCN gas. Careful planning, good housekeeping and application of the fumigant by trained, experienced men are essential for a good kill.

Many food processors have found that control problems are ably handled by established Pest Control Operators. These operators are equipped to give prompt and specialized service on practically any type of mill fumigation.

If you have your own pest control crew, we have a useful book about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. No obligation, of course.

DU PONT

E. I. DU PONT DE NEMOURS & CO.
INCORPORATED
ELECTROCHEMICALS DEPARTMENT
WILMINGTON • DELAWARE

CYANEGG
AN ECONOMICAL SOURCE OF HCN FUMIGATING GAS

War Production Board Orders

Blackplate, Tinplate—Serious shortage of steel has forced WPB to limit the tonnage of blackplate which may be used for beer and nonalcoholic beverage bottle caps for civilian use, at the same time completely prohibiting use of blackplate after August 1, and of tin, effective at once, in the manufacture of closures for wine and distilled spirits. While use of tin in caps for beer and nonalcoholic beverages had previously been restricted, Amended Order M-104 enlarges the list of products for which use of tinplate or terneplate is now prohibited.

After June 1, use of blackplate was restricted to 60 percent of the tonnages used for the same purpose in 1941. Included in the list of products for which closures made of tinplate or terneplate are prohibited are: butter, lard, shortening, edible oils and baking powder. No closures of any of these materials may be used for packing unflavored, carbonated, natural or mineral water bottles smaller than 12 fluid oz., unless the containers were manufactured before June 1.

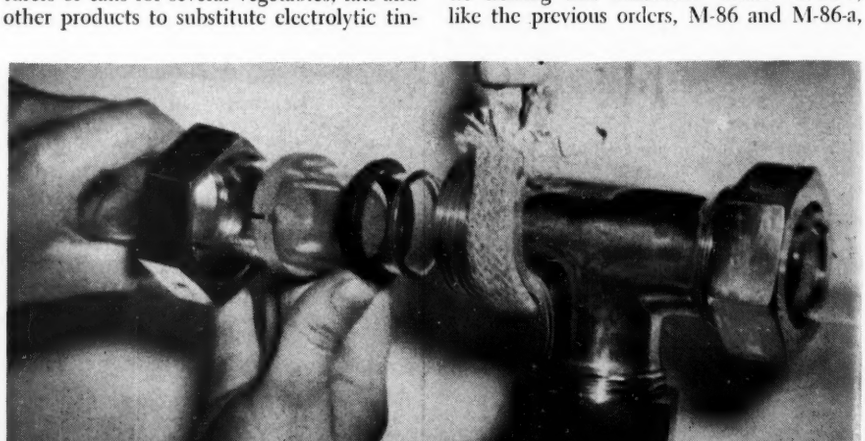
Drum Coatings—Restrictions on drum exterior coatings provide that coatings containing certain organic binders or pigments cannot be used for steel containers of two gallons or more (after June 20). Conservation Order M-158 is expected to save nearly a million pounds of critical oils and resins a year. "Class A" coatings which could not be used after June 20 are those containing tung, oiticica, perilla or dehydrated castor oils, alkyd, phenolic, vinyl, urea or melamine resin, or cellulose esters or ethers. The Order specifies that black coating shall be applied to all containers (other than those for export) except for small areas of color for marking or legal requirements.

Electrolytic Tinplate—Conservation Order M-81-a, effective June 13, ordered manufacturers of cans for several vegetables, fats and other products to substitute electrolytic tinplate and chemically treated blackplate for tinplate whenever possible, to conserve the country's supply of tin. For the balance of the year about 1,000,000 base boxes of electrolytic tinplate and chemically treated blackplate will be substituted for the hot-dip tinplate now used. This will represent a saving of about 350 tons of pure tin.

Manufacturers of the following products are expected to use electrolytic tinplate to the greatest extent possible; asparagus, green and wax beans, certain fish and shellfish, frozen foods, honey, beets, carrots, carrots and peas, pumpkin and squash, green leafy vegetables, mixed vegetables, soups (except tomato), sweet sirups, chili con carne and okra. Chemically treated blackplate may be used for hardened edible oils, lard and other fats, dry baby formulas, milks, dehydrated vegetables, liquid oils and coconuts. Other processors are required to use these materials according to a formula outlined in the Order.

Tin for Non-critical Products—Effective July 1, 1942, tin used in non-critical products will be cut another 10 percent, according to an amended version of Conservation Order M-43-a. The new Order, which will provide additional tin for military operations and civilian food supply, will limit all products not covered by specific WPB regulations to 30 percent of the amount of tin used in the corresponding quarter of 1940. Until June 30, 1942, 40 percent of the 1940 amount could be used. The Order was also amended to permit tinning of dairy implements as defined in the order, as well as use of tin for certain imperative military and civilian operations.

Salmon, Sardines—WPB on May 26 ordered canners to set aside for the government their entire 1942 pack of salmon, sardines, Atlantic herring and mackerel. Order M-86-b, like the previous orders, M-86 and M-86-a,



SUBSTITUTE FOR SANITARY PIPE

The scarcity of metals has forced the dairy industry to search for a substitute for metal tubing. The problem has been tackled by the Dairy Industries Supply Association, and with the aid of Corning Glass Works a new type glass piping that apparently meets dairy pipe line requirements has been developed. This pipe can be substituted for stainless or tinned copper tubing and can be used with the present standard 3-A fittings. Joints are made with standard 13-H nuts, small molded rubber gaskets and molded plastic follower rings. Hand tightening is sufficient for dairy-plant pressures.

to fruit and vegetable canners, will assure ample supplies of these fish for the armed forces and Lease-Lend. However, as only 2,500,000 cases of the estimated 1942 pack of 5,400,000 cases of salmon are needed by the government, the rest will be available for civilian markets, as will reserve stocks of sardines, herring and mackerel.

A canner must make weekly reports of the quantity of fish canned. If the fish thus set aside have not been purchased by the government in 30 days he should notify WPB that if they are not purchased within 30 days he will release them to the civilian market.

Food Machinery—General Limitation Order L-83 has been clarified by Amendment No. 1, issued May 29, so that certain types of machinery covered by the order will not be confused with small household types regulated by other WPB orders. The amendment stipulates that coffee grinding machinery and food slicing and grinding machinery, the production and sale of which have been restricted, means machinery of one horsepower or over. The Order was necessary to distinguish between these types of food machinery and the small electrically operated types covered by Limitation Order L-65, which restricts production of electrical appliances for household use.

Included in the new amendment is coffee grinding machinery, one horsepower or over, on orders for a single machine of a value in excess of $50, and food slicing and grinding machinery, one horsepower or over, on orders for a single machine of $50, however, there shall be excluded from the terms of this Order, orders for machinery to which a preference rating has been legally applied, pursuant to the terms of Preference-Rating Order P-115.

Spice Quotas—Food processors, manufacturers of medicines and other industrial receivers of restricted spices must compute their 1942 monthly spice quota on the basis of the average monthly amount of spices they used in the corresponding quarter of 1941. Amendment No. 1 to Conservation Order M-127 and Order M-127-a also gives fruit and vegetable packers the privilege of combining their spice quotas for June, July, August and September as they see fit during that period, because of the seasonal character of their production. A "wholesale receiver," by this amendment, excludes importers and dealers dealing in spices in the original import packages. Spices restricted in the Order include black and white pepper, pimento (allspice), casein (cinnamon), cloves, ginger, nutmeg and mace.

Cellophane—Use of cellophane has been further restricted in an amendment to Limitation Order L-20, effective June 8. Products restricted by the amendment are those of 0.003 in. thickness or less, which includes use of cellophane in window cartons, for carton overwraps, for packaging animal food and candy. Increased use of cellophane for essential food packaging, where it replaces tin, makes it necessary to prohibit cellulose caps or bands of any gage, cellophane used for candy products and chewing gum, except where used as a protection for the product itself, and all window cartons and carton overwraps where used as a protection for the carton rather than the product itself.

Cocoa Powder, Butter—To prevent excessive quota-exempt processing of cocoa beans to fill orders requiring cocoa butter and cocoa powder, WPB issued on June 9 Interpretation 1 to Conservation Order M-145. Some processing methods yield two materials, cocoa butter, used in manufacture of confectionery and bakery products, and cocoa powder, used largely in the household. The new interpretation states that when a processor produces cocoa butter, for example, to fill an order for a quota-exempt government agency, he must give consideration to the cocoa powder produced in the same processing operations. While he may use that powder for any type of order, if subsequent orders requiring the same amount of powder, or less, are received, he may not again use quota-exempt beans to supply that powder. The Order permits manufacturers to process quota-exempt beans to supply material for orders only if he has insufficient material on hand.

Canners' Priority Raised—The first amendment to Order P-115 was issued late in June to give the fruit and vegetable packers a higher priority rating for their material for maintenance and expansion of plants than they have had previously. The rating for materials for repairs, maintenance and operation is raised from A-3 to A-1-j. The rating for material for replacement, addition and expansion is raised from A-3 to A-1-c. The application of the A-1-c rating may be made only when authorization has been received from the Director of Industry Operations.

Classification of Orders—Beginning in July, food processors are required to label all their orders for materials and supplies with the identification, DP-14, under WPB's new system of cataloging the flow of materials. The classification system has no relationship to priorities and it does not get the processor anything he cannot get under regular priorities regulations. The number, 14, is not significant of any level of importance; the designation, DP, merely stands for "Domestic Purchaser."

U. S. and Britain Pool Food Resources

THE U. S.-Britain "Combined Food Board" with powers to coordinate the food stocks of the United Nations, announced by Roosevelt and Churchill on June 9, should be a long step toward solving problems of common concern in regard to supply, production, transportation and distribution. In line with the other combined war agencies set up since January, British and American officials of the Food Board will regard the entire food resources of both countries as a "common pool" to be developed, expanded and purchased as most effective in immediate prosecution of the war.

Problems in Special Coating, Laminating or Adhesives for Paper or Cloth Solved Here!

McLaurin-Jones offers equipment and personnel capable of taking in its stride every conceivable variety of coating, laminating and adhesive problems likely to be encountered in the packaging of foods. Packers and manufacturers for war production requiring special and unusual coating, bindings or adhesives for either paper or cloth find our facilities adequate for the solution of the most difficult or unusual problems.

Recent activities include such diverse development as adhesives for sticking to various types of metals . . . lacquer films for widely varied uses; lamination and lacquering of aluminum foils; decalcomania paper for revenue stamps.

Write for booklet telling about our capacity for solving special problems . . . or tell us what your problem is. We'll be on the job to help you solve it!

McLAURIN-JONES CO.

MILLS: BROOKFIELD, MASS. and WARE, MASS.

OFFICES: NEW YORK • CHICAGO • LOS ANGELES

Government Offers Help To Food Dehydraters

Commercial dehydraters can now get practical assistance on methods and equipment design

EFFORTS to get "food for freedom" by increasing the dehydration of vegetables needed by the military forces and civilian populations are now bringing practical results, according to the U. S. Department of Agriculture, as a result of an emergency research program begun late last summer by the Bureau of Agricultural Chemistry and Engineering. Improvements in the technic of commercial dehydration of vegetables, and the general availability of information, come at a time when problems in distribution and storage of perishable foods are the most difficult in history, according to the Department, because of the military and Lease-Lend needs and the shortages of metallic containers and shipping space.

General and specific information on dehydration processes and detailed plans and specifications for improved driers are now available. The information sheets on commercial dehydration of various vegetables, and the blueprints of equipment for carrying on the processes, were prepared by engineers, food chemists, and technologists, under the direction of the Dehydration Committee of the Bureau of Agricultural Chemistry and Engineering.

Available to persons planning commercial dehydration work, the information sheets include one which gives general information covering all problems from the varieties of vegetables to use, through harvesting, preparation, blanching, drying, design and operation of dehydrators, and the packaging of the final product. Sheets on specific kinds of vegetables cover requirements as to variety, preparation, temperature, vitamin content, and various other factors. At present these information sheets are available on beets, cabbage, carrots, several kinds of greens, onions, sweet potatoes, Irish potatoes, and rutabagas. Later the Bureau plans to issue similar information on some other vegetables and other foods.

The Dehydration Committee has prepared plans, with lists of material and cost data, for commercial dehydrators in sizes ranging from a small cabinet to tunnel types handling 35 tons of freshly prepared material in 24 hours. The blueprints and accompanying statements are available free to those planning to put in driers.

Requests for the blueprints and information sheets or other technical information on dehydration should be sent to The Dehydration Committee, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, Washington, D. C.; or to The Dehydration Committee, Bureau of Agricultural Chemistry and Engineering, U. S. Departments of Agriculture, 800 Buchanan Street, Albany, California.

ODT Eases Truck Order

Driver-Salesmen are placed under the regulations applying to local deliveries

IN AN amendment dated June 1, the Office of Defense Transportation extended General Order No. 6 to apply in all cases where "property is transported solely for the purpose of sale to retail dealers in a vehicle operated by the seller or an employee thereof, which vehicle leaves from and returns to the point of origin on the same calendar day."

Order No. 6 is that imposing restrictions on local delivery services. The change means that driver-salesmen engaged in such operations as the delivery of bread, groceries, ice cream, soft drinks, and tobacco, will be exempt from requirements imposed on over-the-road operators, but will be required to reduce their delivery mileage by 25 percent as compared with the corresponding month of 1941. General order No. 5, applying to private over-the-road carriers, has been revised to correspond with this change.

An amendment announced May 28 defined the local delivery area as extending 25 miles beyond the corporate limits of the municipality in which a delivery originates. All other deliveries involving a distance of not more than 25 miles are defined in the order as local deliveries.

Another amendment announced May 28, to General Order No. 6, changes the requirement of not "more than one delivery between any one point of origin and any one point of destination, in any one calendar day," to permit one delivery "of any commodity, the transportation of which requires the use of special equipment, in a vehicle specially constructed and adapted for and used exclusively in the transportation and delivery of such commodity." It should

LIGHTWEIGHT
SPEEDWAYS
CONVEYOR

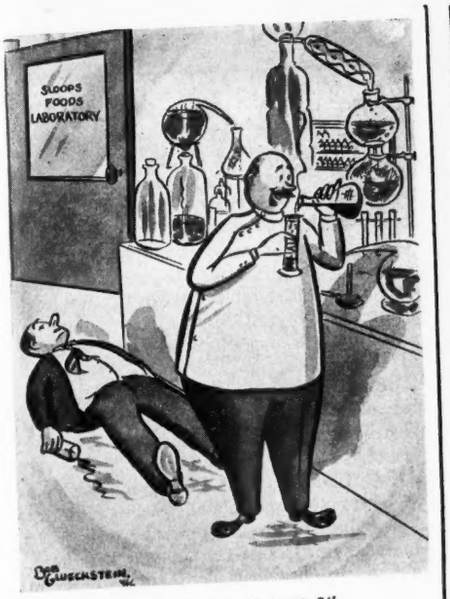
ENLIST SPEEDWAYS to FIGHT for you!

SAVE TIME—increase production
SAVE LABOR—when you need it most
SAVE MOTIONS—decrease fatigue
SAVE CONTAINERS—eliminate spoilage

INDISPENSABLE for
• DELIVERING
• LOADING
• UNLOADING
• CONVEYING

Weighs Only 7 lbs. per foot

Charles S. JACOBOWITZ Corp.
1432 Niagara St. Phone Lincoln 3116 Buffalo, N. Y.



"Well, how's it taste?"

be noted, in this connection, that when one day's shipment or shipments to any one person exceed the capacity of a single vehicle, deliveries of such shipment or shipments shall be considered as one delivery.

Shortening, Salad Oil Packages Simplified

A NEW simplified practice recommendation covering standard packages for shortening, salad oil and cooking oil has just been developed by the Division of Simplified Practice of the Bureau of Standards, Department of Commerce, in cooperation with the manufacturers and packers of shortening and oils, based on a recent survey made by the Institute of Shortening Manufacturers, Inc. It will become effective July 1, and will be identified as R193-42.

Sorghum Flour Used

IN West Texas, flour for food products is being manufactured from sorghum grains. The flour is obtained chiefly from white kafir and hegari. It is being successfully made into yeast breads, biscuits, waffles and gingerbread in the home economics department of Texas Technological College. The flour is said to be nutritious.

SCHEDULE OF EVENTS

JULY

June 29—July 1—National Dairy Council, Edgewater Beach Hotel, Chicago, Ill.

July 11—Industrial Barley Field Day, for all those in the industries interested in barley products, University of Wisconsin, Madison, Wis.

AUGUST

16–22—National Food Distributors Association, Chicago.

31–Sept. 2.—National Nut Growers Association, Royal York Hotel, Toronto, Ont.

SOLVING *Sanitation* PROBLEMS TO HELP YOU PRODUCE MORE!

IMPORTANT FACTS ABOUT MODERN CLEANING COMPOUNDS

There are two basic essentials for an efficient cleaning compound. First, and most obvious, the compound must be able to remove dirt quickly, completely, and economically. If spoilage, off-tastes, off-flavors and the like are to be avoided, all visible contamination must be eliminated. Furthermore, thorough cleaning is a prime pre-requisite to effective, economical sterilizing.

Second, an efficient compound must not corrode the surface being cleaned. Corrosion introduces undesirable metallic off-tastes and flavors into the food product . . . often impairs keeping quality. Corroded equipment becomes increasingly difficult to clean and sterilize . . . costly repairs and even replacement may become necessary.

MOST COMPOUNDS A "COMPROMISE"

Cleaners that are powerful enough to remove stubborn contaminations are usually corrosive to the equipment. Mild cleaners such as washing or baking sodas are at best but a compromise. While reasonably safe to the equipment they are too mild to remove dirt completely without the expenditure of much unnecessary labor.

Diversey Research Laboratories have spent over 18 years developing products that meet these two fundamental requirements of an efficient cleaning compound. Over 10 years ago Diversey chemists produced a cleaner for tinned utensils that is now used extensively in the baking industry. Even today, it is still the only cleaner that will remove baked-on contaminations without damage to the surface even when used in concentrated, boiling solutions.

NO SINGLE COMPOUND A "CURE-ALL"

Diversey Chemists have learned in many years devoted to cleaning problems that no single compound or raw chemical could be produced as a never-fail "cure-all." In the first place there are many types of surfaces . . . tin, aluminum, glass, nickel, monel, plain or galvanized iron, stainless steel . . . most of which require individual measures for protection.

Equally varied is the type of contamination. Most common include oils, fats, greases, starches, proteins, albumens, hard water deposits, scale, mineral salts and matter, and baked-on contaminations. No single raw chemical will assure effective removal of all. Then, too, differences in the cleaning process, accessibility of the surface, area to be cleaned are also factors that require special consideration.

To meet these varying conditions, Diversey Research Laboratories have produced a number of cleaning compounds alike only in their ability to effect complete removal of the contamination without damage to the surface being cleaned. These include Protex Metallum, Everite, D-Luxe, White Flakes, Silico, Pyron, Dicoloid, Peptex, Dilac, Novex, Detergent, Multex, and others. Descriptive literature will gladly be sent on request.

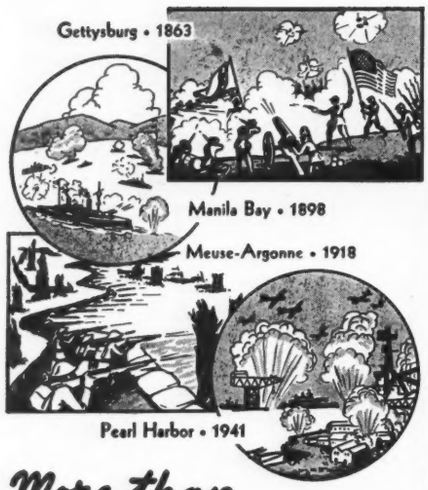
CALL IN A DIVERSEY D-MAN

Call in a Diversey D-Man on your problems in plant sanitation. His many years of practical experience, backed by the Diversey Research Laboratories, assure you of competent, intelligent suggestions. There is no obligation. The Diversey Corporation, 53 W. Jackson Blvd., Chicago, Ill.

Send for Free Bulletin:
"Charting a Course to More Efficient Sterilization"

WIN THE WAR WITH FOOD

GOT A PROBLEM? *Just Call a* DIVERSEY D-MAN

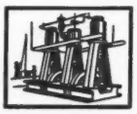


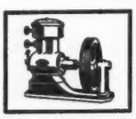
More than
Four Wars Ago

In 1850, to be exact, a millwright named Geoge Frick built his first steam engine, and began the work which now means so much to the Victory Program.

Frick Steam Engine of the Fifties

By 1860 the Frick shops at Waynesboro were producing hundreds of engines. (General Lee's men, during the retreat from Gettysburg, took the belting from the plant, for use as shoe leather.)


Steam-driven Refrigerating Machine of 1883


Enclosed Compressor, Introduced in 1915

By the Spanish-American War, Frick refrigerating machines, introduced in 1882, were used in large numbers for packing meats, making ice, and storing essential foods.

By 1917 the importance of refrigeration was more fully appreciated. Thousands of Frick machines, in powder plants, hospitals, camps, ships, and supply bases, helped America win.

FRICK Refrigeration
Is now used in over 200 Industries

New War Dept. Bldg. in Washington has Frick Air Conditioning

In the present conflict our refrigerating ice-making and air conditioning systems play a still more vital part. Glenn Martin airplanes; Lycoming engines; Pratt and Whitney gauges; Hercules powder; the new War Dept. Building; scores of Army camps, Navy ships, arsenals, food factories, and civilian activities find Frick Equipment an invaluable aid.

Ships of All Classes Find Frick Refrigeration Indispensable

FRICK CO. — DEPENDABLE REFRIGERATION SINCE 1882 — WAYNESBORO, PENNA. U.S.A.

CAPITAL VIEWS

NO EXPOSITION—The customary exposition of American Bottlers of Carbonated Beverages, planned for next November, has been canceled. Conventions to afford opportunity to exchange ideas and work out problems of mutual interest are still encouraged. But expositions take too much transportation and extra labor. Generally speaking, they are taboo for the duration.

PRICE JUGGLING—In fixing lard prices, OPA did a fancy job of readjustment of margins and prices. It sought, and seemingly obtained, no cut in farmers' prices for hogs and no increase in lard prices to the public. The margins between were definitely rearranged. Otherwise, many retailers would have been compelled to go out of the lard business, officials say. This case illustrates perfectly the effort of OPA to regulate every detail and put profit opportunity at the point it thinks wise.

INSECT CONTROL—Restriction on the use of rotenone will prevent food growers and manufacturers from getting one common type of insecticide for many purposes. It is now permitted to use rotenone in certain cattle-treating drugs but not as a fly spray, for example. Unexpected changes in the effectiveness of insecticides are going to follow from this and other recent WPB restrictions on pest poisons.

NO NEW MACHINERY—General regulations and specific rulings of WPB are continually being tightened with respect to any new machinery or construction requiring metal. Even urgent jobs to produce products much wanted by the Army, Lease-Lend for the Department of Agriculture often are turned down at WPB. How to carry out food processing without any new equipment at all is now one of the jobs of the expert food technologist. Oftentimes he will have to borrow from his neighbor or buy from a second-hand man. Makeshift methods are more than expected, they are actually demanded deliberately by Washington officials. WPB expert W. L. Batt says industry's motto must now be "Patch and Pray."

BUSINESS ADVISORS—The Quartermaster Corps has a new board of technical advisors on subsistence. This is particularly important because the Quartermaster Corps is more and more becoming the purchasing agent for foods for Lease-Lend and other agencies, as well as for its own Army use. The Department of Agriculture will have a great deal to do with food manufacturing and food processing control as Secretary Wickard takes up the many parts of his new job as chairman of the Food Requirements Committee. Nevertheless, WPB continues to grant or withhold priorities and allocations; and the Quartermaster Corps is becoming the principal customer of the food industries. In other words, dealing with Uncle Sam gets more complicated month by month.

ALCOHOL FROM GRAIN—Almost 200 million gallons of alcohol from grain are promised next year in addition to the alcohol made at beverage plants. This means that many food manufacturing works will have to be adapted either to make alcohol or to make a sirup by malting which can then be used in industrial alcohol works. Sugar refineries, beet sugar plants, breweries, sirup works and a number of other types of establishments in the food business may find themselves making a grain molasses, or perhaps in the actual alcohol business, before the end of the year. All this is necessary in order that an abundance of alcohol be available as one step toward synthetic rubber.

GOOD PUBLIC RELATIONS—Washington notes an exceptionally keen sense of good public relations in recent releases of American Bottlers of Carbonated Beverages. That agency has had plenty of troubles in serving its numerous members. But it has gone ahead also in fitting its facilities into the set-up of war production. First-aid classes for its driver salesmen; setting up a truck reserve of 50,000 vehicles for potential emergency use; providing filtered and purified water as an emergency reserve if public water supplies are cut off; and a half dozen other volunteer services are being arranged. Public officials appreciate this and reciprocate with sympathetic study when the industry asks for needed relief. Some less skillful groups with equally meritorious cases for official review could perhaps profit by studying the ABCB technic.

TO PREVENT RANCIDITY—Special allocation of some coconut oil for food products has been made because it and other oils high in lauric acid are more resistant to rancidity in hot humid weather. Food manufacturers confronted with this kind of problem would do well to study the May regulations which gave some special relief of this sort.

WHAT IS LIMITING FACTOR?—Manufacturers of foods are restricted in the quantity of business which they can do by a variety of factors. In some cases, sugar or other sweetener is scarce. In other cases, bottles or bottle closures cannot be obtained. Other normal packaging materials may be unavailable. Before long, fats and oils of preferred types are bound to be scarce. Each manufacturer is urged to study all of these variables before coming to Washington with his troubles. He should first clear up his most urgent and most restrictive difficulty and then proceed to the next one. He gets little sympathy when presenting a secondary cause of difficulty before a primary limiting factor has been cleared.

GOVERNMENT CONTRACTS — Any manufacturer with a government contract should study carefully the new pamphlet "Explanation of Principles for Determination of Costs Under Government Contracts." This tells you what you may and what you may not include when you deal with Uncle Sam. Inexperienced contractors are certainly due for some surprises when they read the rules.

War Damage Insurance Offered By Uncle Sam

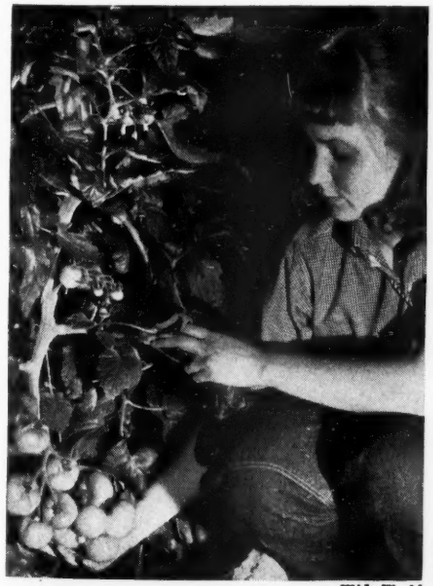
MANY INSURANCE COMPANIES are going to become sales agents for War Damage Corp. That corporation is the one established by the government under RFC to write insurance against enemy damage to property.

The blanket insurance which has been in force by Congressional act expired June 30. Each company desiring protection must, therefore, take out a policy, generally with its favorite fire insurance firm. Protection will apply to physical loss of either real or personal property because of enemy attack or action of U. S. forces in resisting such attack. It will not extend to any of the normal risks nor include pillage, looting, sabotage or many other special hazards.

Rates are uniform for the country and for many varieties of property. For office buildings and warehouses the rate will be 15 cents per $100 of value on fire-resistive construction or 20 cents on ordinary construction. Manufacturing plants, wharves, bridges, and comparable structures take the rates of 20 cents and 30 cents, respectively. A floater policy for movable property and a special provision for property in transit is provided.

Those who wish protection on private dwellings and their contents can also be insured at at rate of 10 cents per $100.

Complete details will be furnished by any insurance company.



Wide World

TOMATOES WITHOUT SEEDS

Sara Heilsen of Needham, Mass., and some seedless tomatoes grown at the Massachusetts State College Experimental Station. More clusters of the tomatoes are grown by spraying the blossoms with hormones.

DOING A JOB FOR *All Out* PRODUCTION!

✓ SAVING TIME ✓ SAVING WORK

✓ FREEING MAN-POWER ✓ SAVING SPACE

IN foundries, ammunition plants, steel and brass mills, aviation machine shops and in scores of other plants, Standard Conveyors are doing an important job—keeping high-speed production machines supplied—moving materials and parts "on schedule" from department to department—freeing manpower for effective work in the nation's "battle of production."

"Conveyorize" To Meet Today's Need For Speed

The 76-page booklet, "Conveyors by Standard," will aid you to determine the best types of power and gravity conveyors to step up production in your plant—suggests how you can "conveyorize" to meet today's need for speed—keep production flowing—utilize every square foot of floor space effectively—save time, costs, and manpower in handling. Write for your copy of Bulletin FI-7, "Conveyors by Standard."

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FIRST FOR FASTER PRODUCTION

Biscuit, Cracker Bakers Discuss War Problems

Industry asked to shorten delivery routes and cut number of varieties. Better maintenance urged

DISCUSSION of problems arising from price-ceiling regulations and from curbs in supplies and equipment dominated the annual meetings of both the Independent Biscuit Manufacturers Co., Inc., and the Biscuit and Cracker Manufacturers Association of America, at the Drake Hotel, Chicago, May 27 and 28.

As usual, the Independent Biscuit Manufacturers Co., Inc., held its meeting first, with one of the largest attended meetings in its history. President H. L. Popp cited government regulations as forces making for efficient operation of cracker and biscuit plants. However, he protested the inequity of price ceilings set at March levels, because they do not take into account the rise in cost of labor and materials.

The importance of systematic servicing and inspection of operating equipment to prolong its period of use and to improve its efficiency was emphasized by F. E. Youngdahl of American Machine and Foundry Co. Spare parts should not be taken for granted, any more than should the machine as a whole, and he urged that a cooperative effort be made for the interchange of repair parts during emergency periods by various plants using the same or similar machines.

John T. McCarthy, WPB Baking Industry Advisory Committee, advised the biscuit and cracker industry to shorten delivery routes and to cut the number of varieties in the interest of conservation and of cost economies.

In his talk to the Biscuit and Cracker Manufacturers Association meeting on May 28, L. J. Schumaker, president of American Bakers Association, urged those present to regard government regulations and rulings as incidental to the winning of the war and stated that, when dealing with government officials, facts and data carried more weight in discussion than do arguments and objections. He announced that the biscuit and cracker bakers have taken affirmative action to help in the support of the American Bakers' Association office in Washington and to share in its activities for the benefit of the Baking Industry as a whole.

Tom Smith, Secretary of American Bakers' Association, while discussing the importance of a systematic maintenance and repair program, of saving worn parts, and of effecting operating economies, stressed the importance of well-planned protection against fires. With building materials and equipment difficult or impossible to obtain, insurance coverage means little in getting a fire-damaged plant back into production.

Confectioner's Problems

In reviewing some of the problems that the confectionery industry has in common with the biscuit and cracker industry, Philip P. Gott, president of the National Confectioners Association, stated that readjustments are being made as rapidly as conditions permit, particularly through simplification in size of production units and in variety of items made. He said that transportation problems are being discussed in terms of limiting distribution areas and of realigning sales activities, and that attempts are being made to maintain candy production poundage by increased use of other ingredients than sugar and chocolate. However, difficulties are being experienced because price-ceiling rulings fail to make allowance for raw material scarcity and increase in cost. The candy industry in general operates on an inventory instead of a replacement-cost basis, so that the price at which candy was sold in March reflects the material costs of last fall. In the meantime, agriculturally produced ingredients have averaged a 30 percent rise in price and some, such as peanuts, have doubled. Should the confectionery industry be forced to absorb this increase, as well as increased labor and tax cost, on the basis of March prices for candy, the financial structure of the industry will be destroyed.

New Officers

C. H. Wortz, Jr., president, Wortz Biscuit Co., Fort Smith, Ark., was elected president of the Independent Biscuit Manufacturers Co., Inc., to succeed Mr. Popp. F. J. Delaney, Midwest Biscuit Co., Burlington, Iowa, was elected vice-president, Stuart Johnston, of Robert A. Johnston Co., Milwaukee, Wis., treasurer, and H. D. Butler was reelected secretary.

The Biscuit & Cracker Manufacturers' Association elected D. F. Bremner Bros., Chicago, president; vice-presidents are A. P. Strietmann, Strietmann Biscuit Co., Cincinnati, Ohio; Hanford Main, Loose-Wiles Biscuit

How Metso Cleaners Prevent Waste
LESS DOES MORE
Metso's uniform cleaning strength is long sustained at a high degree of activity. Because of this efficiency you use less cleaner. Most operations in food plants take less than one ounce per gallon of water.
When you buy Metso, you save in this way too. Metso is a basic alkali, sodium metasilicate,* and therefore priced as other raw materials.
We shall be glad to send you a trial sample with instructions for your particular cleaning operation.
*Sodium Metasilicate U. S. Pat. 1898707
PHILADELPHIA QUARTZ CO.
125 S. Third St., Phila., Pa. • Chicago Sales Off.: 205 W. Wacker Dr.
Sold in Canada by Nat. Silicates, Ltd. Distributors in 60 cities.
METSO CLEANERS
METSO

Co., Long Island City, N. Y., and F. K. Montgomery, National Biscuit Co., New York. R. T. Stokes, of New York, is secretary-treasurer.

Ceiling Lifted On Some Foods

OPA exempts certain commodities from price regulation; cuts lard price to February level

CEILING prices were lifted on some food commodities and adjusted on others during June, according to a series of OPA announcements. Purchases of canned tomatoes and peas for use by military and Lease-Lend agencies were excluded from provisions of Maximum Price Regulation No. 152 (canned vegetables) and from the General Maximum Price Regulation. "Unprocessed" agricultural commodities such as peas, lentils, seeds and hops that merely are dried, were exempted from the Regulation, as were canned citrus fruits and juices. Processors' maximum selling prices on refined lard to wholesaler and retailer were cut back to the February 1942 level.

Army demands for better grades and larger can sizes of tomatoes and peas was behind Amendment No. 1 to the Regulation, effective June 15, which has aided the government buying program. Before the amendment was added, the Department of Agriculture's support prices of Grade C or standard tomatoes and peas, packed in No. 2 cans, was an incentive for heavy production and packing of that grade, which does not meet the usual Army requirements.

Amendment No. 4, effective June 5, defined unprocessed foods which are not subject to ceiling prices as "raw agricultural or greenhouse commodities" while they remain in the original state, except for dried fruits and dried berries (other than prunes), bananas, and dried imported foods. Canned citrus fruits and juices were exempted on June 8 in Amendment No. 3 to Supplementary Regulation No. 1, so that prices to growers on these foods will be sufficiently high to meet the provisions of Emergency Price Control Act of 1942 which guaranteed farmers that no ceilings would be imposed that would prevent certain minimum prices.

Ceiling prices on refined lard to wholesalers and retailers were fixed at the February level, but prices to consumers remains unchanged at the March 1942 peak. Amendment No. 3 to Revised Price Schedule No. 53 (Fats and Oils), effective June 8, readjusted more equitably the internal margin of profits in lard at all stages of distribution.

Lactic Acid Lacquer For Milk Cans Tested

A NEW TYPE of plastic material made from lactic acid has been proposed for milk equipment coating as a substitute for tin. The research on this material was done in the Bureau of Dairy Indus-

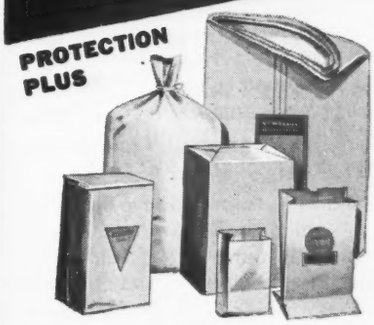
SHIPS SLIP ON BANANAS

People have been slipping on banana peels for generations, but it has taken two world wars to find a practical application of the slippery properties of this tropical fruit. Now bananas are being used by the ton to "grease" the ways for launchings in a shipyard that is building boats for the Victory Fleet. Split bananas are placed in skids under the launching cradle.

IF YOU ARE NOW PACKING OR SHIPPING FOODS IN

✕ METAL CONTAINERS
✕ BURLAP BAGS
✕ BOX CRATES
✕ CARTONS

EQUITABLE "Protection-Plus" BAGS MAY SOLVE YOUR PROBLEM



By processing paper stocks, by using special combinations of papers, and by new manufacturing methods, Equitable's Research Staff is daily solving the problems of many outstanding food manufacturers. Perhaps we can help solve yours.

EQUITABLE PAPER BAG COMPANY

Executive Offices and Northern Bag Factory
47-00 31st PLACE, LONG ISLAND CITY, N. Y.
Paper Mill and Southern Bag Factory — Orange, Texas

UNION SPECIAL SEWED CLOSURES

A SOLUTION for many of Today's Packaging Problems

HERE is a packaging set-up that rates high in meeting many of today's requirements:

- ELIMINATES USE OF SCARCE MATERIALS.
- REQUIRES MINIMUM ADDITION OF NEW MACHINERY.
- EASILY ADAPTABLE TO MANY EXISTING CONVEYORS AND PRODUCTION LINES.
- CUTS PACKAGE SHIPPING WEIGHTS AND SPACE REQUIREMENTS.
- SIMPLE TO OPERATE. HIGH PRODUCTION RATES. NEAT, DURABLE PACKAGES.

The machine (shown above) is Union Special sewing head *Style 60000C*, fitted to apply narrow reinforcing tape on each side of top of bag and equipped with an automatic trimmer for top of bag and an automatic cutter for severing tape between bags.

INFORMATION:

UNION SPECIAL MACHINE COMPANY
426 N. Franklin St., Chicago, Ill.
Please send information about bag closing machines for handling the following product:

_____

Size of bag:_____

Name_____

Company_____

Address_____

try at Washington from which preliminary observations and experience have been released.

The new material is a polymer made from lactic acid and a semi-drying vegetable oil such as castor oil or soybean oil. The Bureau and certain cooperating companies outside are still working on the proper methods for manufacture and application. Preliminary results are encouraging.

Some of the material has been used as a substitute for tin in coating milk cans which are being used in the work of the Bureau itself. The new lacquer appears to be standing up well under these preliminary tests which involve both wear from handling and from daily sterilizations with steam and alkali solutions.

One of the several important problems still to be solved is the control method required during manufacture and use. It is not yet established just how best to make the plastic. If it is processed too long during manufacture, it does not work well when sprayed or coated on the metal containers. If it is not sufficiently cured, it is difficult to dry in place or bake onto the container in a practical length of time.

Fats and Oils Consumption Up

APPARENT disappearance of fats and oils into consumption in the first three months of 1942 was nearly 2,500,000,000 lb., up some 100,000,000 lb. above the corresponding period of 1941. Increases occurred chiefly in lard, corn oil, sunflower oil and inedible oils and greases. In contrast, less was used of cottonseed oil, coconut oil, peanut oil and olive oil. It is thought that the stocking of products containing fats and oils, under the stimulus of rising prices, was partly responsible for the apparent increased consumption. Another factor in the increased use of the edible fats and oils is the increased purchasing power of many consumers. Finally, continued increased buying for lease-lend shipments is a factor in edible oil and fat consumption increases.

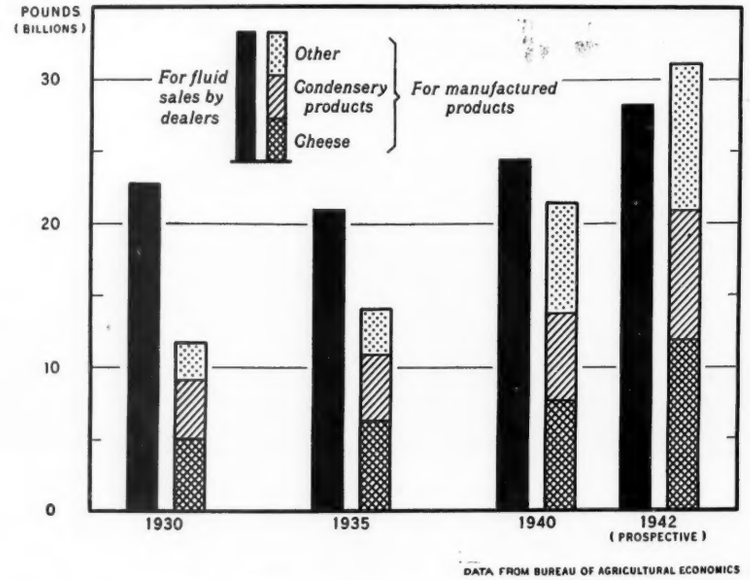
The first of these factors should disappear with the price ceilings now in effect, but the action of the other two factors will continue to force up the consumption of oils and fats.

Commodity Prices Lower Under Ceilings

WHILE general commodity prices have remained about unchanged for the period from mid-May to mid-June, some food commodities are distinctly lower. The general commodity price index of the *N. Y. Journal of Commerce*, which stood at 103.5 on May 9, 1942, was at 103.3 on June 6, 1942. For the same period, the same publication's grain price index fell from 92.9 to 87.9 and its food price index rose from 103.2 to 104.6.

Wheat, No. 2, hard winter, Kansas City, at \$1.13¾ on May 14, fell to \$1.08 by June 9. Corn, No. 3, yellow, Chicago, at 85½¢ on May 14, declined to 83¾¢ on June 9. In the same period, flour dropped from \$6.05 to \$5.80. Beef increased from 20½¢ to 21¢, lamb was steady at 24¢ and pork loins unchanged at 28¢. Lard decreased slightly, from \$12.60 to \$12.50. Butter at 37½¢

UTILIZATION OF WHOLE MILK DELIVERED BY FARMERS TO PLANTS AND DEALERS, UNITED STATES, 1930, 1935, 1940, AND PROSPECTIVE 1942



DATA FROM BUREAU OF AGRICULTURAL ECONOMICS

on the earlier date, fell to 36¾¢, while eggs rose from 29¾¢ to 31¼¢. Sugar, coffee and cocoa were unchanged under their price ceilings. Cottonseed oil and important canned foods also registered no changes.

1942 Crop Outlook For Bumper Yields

REPORTING on June 10th, for the United States crop outlook as of June 1, 1942, the Department of Agriculture stated that crop prospects have rarely averaged better for the season of the year. This condition, combined with increased acreage for many crops, indicates that favorable weather conditions will result in high record yields. Livestock production also promises to reach record levels, with high yields of feeds in prospect.

Winter wheat was forecast at 646,931,000 bu. and spring wheat at 221,128,000 bu., making a total wheat crop estimate of 868,057,000 bu. This figure is 8 percent under last year's harvest, but is well above the 1930-1939 average of 747,507,000 bushels.

Oat yield was forecast at 1,252,380,000 bu., above both last year's crop and the ten-year average yield. Rye prospects are for 54,397,000 bu., compared to 45,191,000 bu. harvested last year. Barley production is expected to exceed 400,000,000 bu. for the first time on record.

Among the fruits, only two predictions were made. The peach crop is expected to be around 67,418,000 bushels, compared to 74,170,000 bu. in 1941 and to a ten-year average of 54,706,000 bu. Pear yield is placed at 29,303,000 bu., compared to 29,533,000 bu. last year and to a ten-year average of 27,253,000 bushels.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded June (thousands)	Total Awarded 1942 (thousands)
Bakery	.....	.....	$50
Beverages	$50	.....	927
Canning and Preserving	80	$42	315
Cold Storage Plants	40	.....	405
Confectionery	.....	.....	.....
Grain Mill Products	90	75	395
Ice Manufactured	.....	.....	140
Meats and Meat-Products	40	.....	183
Milk Products	510	.....	992
Miscellaneous	1,040	160	3,311
	$1,850	$277	$6,718

INDICATORS

Flour production in May, 1942, as reported by *The Northwestern Miller* for mills accounting for 65 percent of United States output, was 5,328,007 bbl., compared to 5,796,642 bbl. produced by the same mills in May, 1941.

Confectionery and competitive chocolate products sales in April, 1942, as reported by the U. S. Department of Commerce for 192 reporting firms, totaled $28,761,000, a gain of 36 percent over April, 1941, but 6 percent below sales in March, 1942, by the same firms.

Pork production in May, 1942, was the largest on record for the month, more than 10 percent above May, 1941.

Green pea acreage for canning and freezing this year is now reported in the U. S. Department of Agriculture at 485,350 acres, 25 percent above the 386,160 acres planted last year.

Egg drying plants now in production are reported by the Department of Agriculture to number 80 and to have an output of 260,000,000 lb. per year.

Evaporated milk produced in April, 1942, totaled 356,799,000 lb., 41 percent greater than the April, 1941, production and 79 percent above April, 1936-1940.

Evaporated milk production in the first four months of this year is reported at 1,299,831,000 lb., 63 percent greater than in the same period last year.

Condensed milk produced in April, 1942, totaled 4,404,000 lb., 49 percent below production in April, 1941, but 13 percent above the April, 1936-1940, average.

Dried skim milk produced in April, 1942, is estimated at 59,000,000 lb., 27 percent above production in April last year and 49 percent over the April, 1936-1940, average.

Fruits, frozen, in storage on June 1, 1942, totaled 105,905,000 lb., compared to 91,406,000 lb. on June 1, 1941, and to a 1937-1941 average of 79,310,000 pounds.

Vegetables, frozen, in storage on June 1, 1942, totaled 48,523,000 lb., compared to 43,878,000 lb. a year earlier.

Butter, creamery, in storage on June 1, 1942, totaled 64,797,000 lb., compared to 56,792,000 lb. on June 1, 1941, and to an average on June 1 in 1937-1941 of 48,972,000 pounds.

Cheese, all kinds, in storage on June 1 of this year was 223,223,000 lb. The figure one year earlier was 119,718,000 lb., and the average for June 1 in 1937-1941 was 92,652,000 pounds.

Eggs, case equivalent, in shell or frozen storage, totaled 12,859,000 cases on June 1, 1942. One year before the quantity was 9,163,000 cases and the average for June 1 in 1937-1941 was 9,382,000 cases.

Poultry, all kinds, frozen, in storage on June 1 of this year was 80,142,000 lb., compared to 87,433,000 lb. on June 1, 1941, and to an average on June 1 in 1937-1941 of 73,106,000 pounds.

Meat, all kinds, in cure and frozen storage, totaled 774,193,000 lb. on June 1, 1942. The total one year earlier was 955,553,000 lb., and the average for June 1 was 737,396,000 lb., in 1937-1941.

Lard in storage on June 1, 1942, totaled 111,302,000 lb., and rendered pork fat in storage on that date totaled 7,362,000 lb. The combined figures for these two products on June 1, 1941, was 373,850,000 lb., and the average for the two on June 1 in 1937-1941 was 223,036,000 pounds.

Eggs set by hatcheries, May 1 to May 15, 1942, were 8 percent over the figure for the same period of last year. The hatch in May, 1941, was the largest ever recorded for that month and totaled 224,247,000 chicks.

Eggs, liquid, packed in April, 1942, totaled 94,100,000 lb., 78 percent above the production of April, 1941.

Eggs, dried, whole, produced in April, 1942, totaled 19,609,258 lb., compared to production of 243,497 lb. in April, 1941.

Milk sales in April showed a daily average increase of 6.5 percent over April, 1941.

Butter, creamery, produced in April was estimated at 150,695,000 lb., a decrease of 8.3 percent below output in April, 1941, but 7.3 percent above the April, 1931-1940, average.

Cheese, American, produced in April, 1942, was 85,960,000 lb., 57 percent over the output in April of last year and close to the record cheese production of June, 1941.

Cheese, American, produced in the first four months of 1942 is estimated by the Department of Agriculture at 272,380,000 lb., 56 percent greater than production in the same months of 1941 and 122 percent over the 1931-1940 average production for the period.

Oleomargarine sales in April, 1942, as indicated by sales of internal revenue stamps, totaled 28,910,472 lb., 15 percent below sales in April of last year.

Cost of living index of the National Industrial Conference Board for April, 1942, was 97.1, an increase of 1 percent over March, 1942, and 11.7 percent above the index for April, 1941.

Business activity index of *Business Week* stood at 182.1 on June 13th, compared to 181.0 one month earlier and to 157.3 a year earlier.

Weekly wholesale food price index of Dun & Bradstreet stood at $3.60 on June 16, 1942, compared to $3.69 on May 19, 1942 (the peak for the last 16 years), and to $2.99 a year ago.

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Ask for a demonstration . . . a chance to compare F-M and any other motor construction, point by point. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

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MOTORS
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INDUSTRY

American Dehydration Co., New York, has been incorporated at $110,000 to dehydrate and vacuumize fruits and vegetables.

Armour & Co., Chicago, plans to build a storage warehouse and processing plant in San Antonio, Tex., at a cost of $40,000.

Bradley Produce Co., Harrison, Ark., has opened the first egg-drying plant in Arkansas to process eggs for Lease-Lend and Army use. The plant will process about 52,500 lbs. of eggs every two weeks.

Doughnut Corp. of America's egg drying plant in McKenzie, Tenn., which started breaking eggs last January, is rapidly nearing capacity of 1,000 cases a day.

Fairmont Creamery Co., Omaha, Neb., has completed a new egg-drying plant at Crete, Neb., with a capacity of 540,000 eggs per day. Charles P. Schow is general foreman.

M. C. Friel & Associates, in cooperation with the State Agricultural Commission, plans construction of a $1,500,000 beet sugar refining plant near Harlingen, Tex.

General Foods, Inc., New York, has given a $3,000 fund to the University of Nebraska college of agriculture to be used in safeguarding the supplies of suitable Leoti sorghum seed in Nebraska. Tests made at that institution have shown that Leoti has good possibilities for the production of industrial starch.

H. J. Heinz Co., Pittsburgh, Pa., has started preparations for a pickle salting plant at Mitchell, Neb., with receiving stations at Henry and Morrill, Neb.

Hovden Food Products Corp., Monterey, Calif., plans to erect a $1,000,000 fish canning and reduction plant near Princeton, Calif.

W. K. Kellogg Foundation of Battle Creek, Mich., has presented grants totaling $20,000 to the University of Nebraska colleges of medicine and dentistry to be used for loans or scholarships to aid students of limited means during the present emergency period.

Lee Dingee, Inc., Lindale, Tex., has opened its new three-line plant at Clarksdale, Tex., with a capacity of 500,000 cases a year. This season the company will pack Alaska peas, tomatoes, beets, beans, spinach and sweet potatoes.

Oscar Mayer & Co., Madison, Wis., will build a new $70,000 three-story warehouse for storage of canned meats packed for the government.

JOHN M. FISHER

WILLIAM WARD

Standard Brands, Inc., has announced two additions to the executive staff of Harold G. Cutright, vice-president in charge of finance. John M. Fisher was named treasurer, and William Ward will serve as comptroller. Mr. Fisher has been manager of the corporate buying and underwriting department of Lazard Freres. Mr. Ward has been comptroller of National Dairy Product's Sugar Creek Co., Danville, Ill.

Sparta (Wis.) Cooperative Creamery Association has been granted permission by WPB to construct a new $300,000 plant for the manufacture of dry-skimmed milk for Lease-Lend.

Washington Packers, Inc., Sumner, Wash., has leased the vegetable packing plant of Puget Sound Vegetable Growers' Association at Sumner, where it will pack and ship fresh vegetables under its "Dewkist" label.

DR. LAWRENCE W. BASS

Dr. Lawrence W. Bass has been appointed director of New England Industrial Research Foundation, Inc., Boston, Mass. This organization was sponsored by the New England Council for the purpose of maintenance and further expansion of industrial New England. Dr. Bass was director of research, the Borden Co., prior to his return to Mellon Institute of Industrial Research, Pittsburgh, Pa., in 1937, when he became assistant director of that institution.

Whitehouse Milk Co. will spend over $100,000 in building a two-story milk products plant in Marathon, Wis. The plant will be 100x100 ft. in size.

Wilson & Co. on May 24 opened a new branch plant in Birmingham, Ala., with complete equipment for processing, refrigerating and distributing meat products. W. W. McLeod is plant manager.

G. C. Wilson Laboratories will build and operate a sweet potato dehydrating plant in Denton, Tex., at a cost of $75,000.

PERSONNEL

C. F. Bliss, secretary of National Biscuit Co., has been elected chairman of the Food Industries division of the New York Russian War Relief.

R. M. Cooledge, former traffic manager of Northwestern Fruit Exchange, has been appointed sales manager of Cedergreen Frozen Pack Corp., Wenatchee, Wash.

C. L. Dilts, eastern sales manager for Fairmont Creamery Co., stationed at Cleveland, Ohio, has been elected a vice-president of the company.

Howard Drew, assistant to J. J. Werner in the cereal sales promotion department of

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549 W. Washington Blvd.
Phone State 6819

CLEVELAND
Viking Pump Company
310 Marshall Building
Phone Cherry 0687

INDIANAPOLIS
Viking Pump Company
320 Pennway Building
Phone Lincoln 4788

BALTIMORE
Wallace Stebbins Company
Charles & Lombard Sts.

BOISE
The Olson Manufacturing Co.
P. O. Box 1487

BOSTON
Hayes Pump & Machinery Co.
125 Purchase St.

BUFFALO
Root, Neal & Company
64 Peabody Street

CINCINNATTI
William T. Johnston Co.
210 Vine Street

DETROIT
Kerr Machinery Co.
Kerr Building

KANSAS CITY
Viking Pump Company
601 Pickwick Building
Phone Harrison 8033

SAN FRANCISCO
De Laval Pacific Co.
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LOUISVILLE
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MEMPHIS
J. E. Dilworth Co.
347 South Front St.

NASHVILLE
General Equipment Co.
Fred R. Watson
612 Broadway

NEW ORLEANS
Menge Pump & Mach. Co.
Masonic Temple Bldg.

MILWAUKEE
Viking Pump Company
610 West Michigan St.
Phone Daly 0807

MINNEAPOLIS
Viking Pump Company
35 Holden St.
Phone Main 8247

NEW YORK
Viking Pump Co.
1841 B'way at 60th St.
Phone Circle 7-3324

PHILADELPHIA
Walter H. Eagan Co.
2336-38 Fairmount Ave.

PITTSBURGH
Power Equipment Co.
Oliver Building

RICHMOND
Richmond Engineering Co.
7th and Hospital St.

LOS ANGELES
Viking Pump Company
2040 So. Santa Fe Ave.
Phone Kimball 4470

ST. LOUIS
Lane Machinery Co.
7th & Market Streets

TULSA
Warner Lewis Company
716 South Troost Street

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

LEONARD G. BLUMENSCHINE

Leonard G. Blumenschine, president of Best Foods, Inc., in which Hecker Products Corp., New York, holds a 71 percent stock interest, has been elected president of the latter concern. He succeeds Guy Lemmon, resigned. Mr. Blumenschine will continue as president of Best Foods. He was formerly connected with other subsidiaries of Hecker Products Corp.

F. J. LUNDING

Jewel Tea Co., Inc., has elected F. J. Lunding as president and M. H. Karker as chairman of the board. Mr. Lunding was formerly executive vice-president in charge of Jewel Food Stores; he has been associated with the company for eleven years. Mr. Karker, who served as Jewel's president for eighteen years, will spend part of his time now in direct war work.

Miller Cereal Mills, Omaha, Neb., has been appointed promotion manager.

Harry B. George, Jr., Winnetka, Ill., has been named special advisor to the Quartermaster General for the procurement of perishable foods for the Army.

Alfred A. Halden, secretary of National Starch Products Co., New York, has been elected a vice-president.

John H. Kraft, executive vice-president, Kraft Cheese Co., is the newly elected president of National Cheese Institute.

Joe W. Lauck, Jr., assistant sales manager of the Dr. Pepper Bottling Co. at Waco, Tex., has been elected president of the firm.

Jean Lesparre, industrial consulting chef, holder of the 1941 Medal given by Women's National Exposition of Arts and Industries, is now with Armour & Co. in its experimental sausage kitchen in Chicago.

Louis E. Leverone has retired as general manager of Stein, Hall & Co., Inc. He will continue as vice-president.

Lt. Col. Paul P. Logan, Chief Subsistence Officer, U. S. Quartermaster Corps, Washington, D. C., has been promoted to rank of Colonel. His duties remain the same.

Carl Shelley Miner, of Miner Laboratories, chemical consultant and member of the research directorate of nationally known chemical companies, has been initiated into honorary membership of Alpha Chi Sigma.

John H. Nair, Atlanta, Ga., has joined the research staff of Swift & Co., Chicago, Ill.

James R. Nicholson of the Browning Industry Foundation, former assistant to the president of Jacob Ruppert, Inc., has become senior business consultant in the food and beverage division, OPA.

Dr. John M. Sharf has resigned as director of the technical laboratories of American Bottlers of Carbonated Beverages in Washington, to do research work in the central technical laboratories of Armstrong Cork Co., Lancaster, Pa.

J. A. Skogstrom, formerly production supervisor of Proctor and Gamble, has joined the staff of Kroger Grocery & Baking Co., Cincinnati, Ohio, as an industrial engineer.

Guy P. Stevens, supervising inspector of the dairy and food division of Utah, has been elected president of the 11-state western division of the association of food and drug officials.

E. Clifford Williams, vice-president and director of research for General Mills, Inc., Minneapolis, Minn., was recently awarded the 1942 William H. Walker medal of the American Institute of Chemical Engineers.

DEATHS

John M. Barber, 56, retired executive vice-president of Ward Baking Co., and formerly associated with OPM, May 11, in New Rochelle, N. Y.

Chandler V. Copps, 36, vice-president and sales manager of Copps Co., May 8, in Stevens Point, Wis.

William Fulton, 74, former vice-president and general manager, King Midas Flour Mills, April 29, in Minneapolis, Minn.

William A. Jameson, founder of Jameson Tea & Coffee Co., Victoria, B. C., recently, in Victoria.

Fred Krey, 76, president of Krey Packing Co., and past president of American Meat Packers Association, May 31, in St. Louis, Mo.

W. D. Lindsay, 71, retired executive of Welch Grape Juice Co., recently, in Westfield, N. J.

Henry Mock, 67, retired manager of the New Rochelle, N. Y., branch of Jacob Ruppert Brewery, May 25, in Bronx, N. Y.

H. K. Smith, 65, president and general manager of the Arkansas Rice Growers Cooperative Association, June 8, in Wheatley, Ark. He was a leader in the development of the rice growing industry.

ASSOCIATED INDUSTRIES

American Can Co. has announced appointment of F. C. Baselt as manager of research, Atlantic Division. Mr. Baselt is one of the industry's leading authorities on heat penetration in the processing of canned foods, and of research development on the linings for beer cans.

Carrier Corp. has reported the death of Irvine Lyle, 68, president and a founder of the corporation, June 7, in Syracuse, N. Y. Mr. Lyle in 1902 collaborated with Dr. William Carrier in developing scientific air-conditioning.

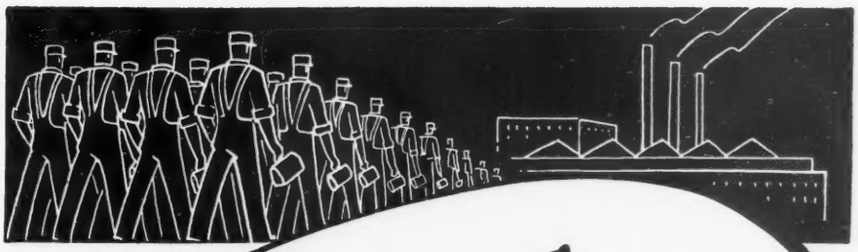
Commercial Films, Inc., Cleveland, Ohio, has released a series of health-education films to be presented in war industry plants, to teach workers the importance of safeguarding against illness and accident. Already available are "Take Care of Yourself," "The Cold Bug," "Food Keeps You Fit," and "Stay On the Beam," (morale); subsequent films will stress other aspects of health maintenance.

Continental Can Co. has opened its new Minnesota plant, a one-story brick building covering over 165,000 sq. ft. of manufacturing and warehousing space, plus 53,500 sq. ft. of shipping facilities. The plant will have complete productive capacity to take care of the present demand for packers' cans.

Jeffrey Manufacturing Co., Columbus, Ohio, has been presented with the Navy "E" for its contribution to the war production effort.

Mathieson Alkali Works, Inc., to commemorate its fiftieth anniversary, published an illustrated booklet, "Fifty Years of Chemical Progress," tracing growth and major developments of the organization.

Westinghouse Electric and Manufacturing Co. has completed its "Health for Victory" Club program in its Mansfield, Ohio, plant, and is ready to expand the program to all industrial plants.



OAKITE DEODORANT No. 1

does 3 sanitation jobs in 1 operation!

DEODORIZES!

CLEANS!

DISINFECTS!

Because working forces in so many plants are increasing enormously . . . because washroom, lavatory and similar facilities are being used to the limit . . . maintenance men daily are confronted with such pressing problems as . . .

How can required sanitation standards be maintained more easily and economically?

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You, too, will find the right answer in Oakite Deodorant No. 1. This TRIPLE-ACTION material DEODORIZES, CLEANS and DISINFECTS . . . ALL in ONE operation! It effectively destroys odors . . . quickly removes all dirt . . . disinfects surfaces to which it is applied. Gives you high sanitation efficiency at low cost.

8 Advantages Oakite Deodorant No. 1 Gives You!

- ☆ Highly effective for washrooms, lavatories, shower stalls, locker and first aid rooms, etc.
- ☆ Instantly soluble in COLD water. Hot or warm water unnecessary.
- ☆ Odorless itself, it does not "cover up" or mask one odor with another.
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- ☆ Economical . . . costs only few cents to make gallon of solution.
- ☆ Safe to use, easy on the hands.

ONLY A FEW PENNIES A GALLON!

Oakite Deodorant No. 1 costs only a few pennies a gallon . . . pays for itself through the time and work it saves and the results it provides. Try it in your plant. See for yourself how it works, what it does! Available in 45-lb. containers. Write for complete descriptive folder, FREE for the asking.

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There is plenty of dust in the "milky way" of powdered milk production, for example. And, in spray drying milk, an estimated 15% of the powder may be lost in the exhaust gases. Similar losses with other dehydrated foods sometimes run as high as 30%! A Buell Dust Recovery System, installed in conjunction with spray, drum or rotary dryers, will soon pay for itself in material saved.

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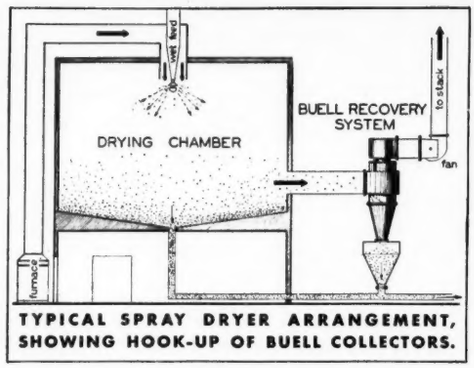

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Our engineers will be glad to work with yours in designing a new system, or in helping to increase the efficiency of your present installation.

For a complete description of Buell Dust Recovery Systems, in relation to dehydration processes, write for Bulletin FI.

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CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

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DUST RECOVERY SYSTEMS

FOOD EQUIPMENT NEWS

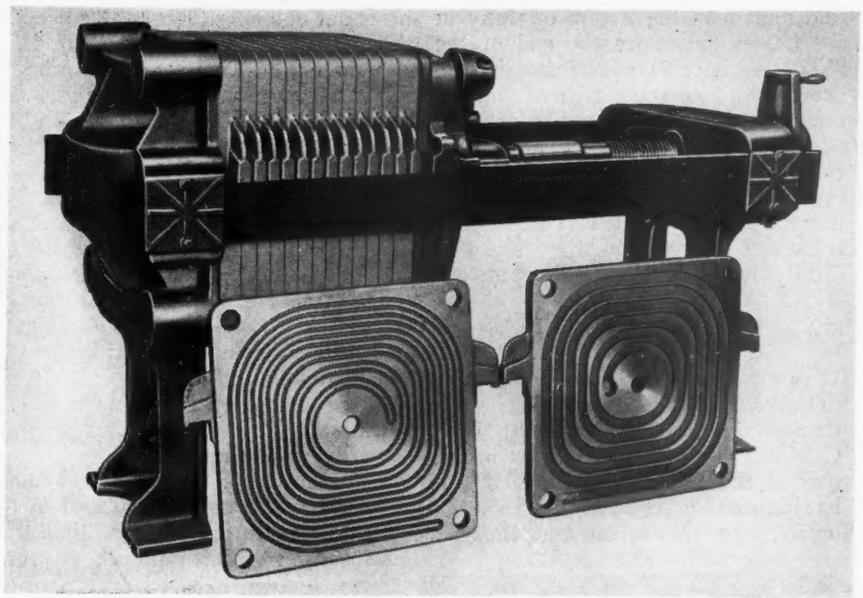
Food Dehydrator

BRIDGES-WILSON CORP., 206 Massachusetts Ave., Arlington, Mass., has developed the "Brilsonair" dehydrator for blanching and dehydrating vegetables, fruits and meats prepared in the form of slices, cubes or shreds. This dehydrator is of the compartment type, with the product that is being dehydrated carried on a multiplicity of trays on a truck. It can be made in single or multiple units, with capacities of 1000 lb. per charge per unit. Each truck (one truck is used per unit) carries 80 trays. Each tray has approximately 8.25 sq.ft. of area. The single unit dehydrator is 8 ft. square. It has a capacity of two trucks—one ton of fresh product—per day. Height of the unit is 11 ft. 6 in.

When multiple units are used they can be operated individually, or as a tunnel dryer for continuous processing.

A feature of this dehydrator is flexibility of the air distribution system. For example, when used as a tunnel dehydrator made up of two or more units, the temperature can be different in the several units so as to give progressive dehydration. In a two-unit dehydrator, the separate units can be used at the same time for dehydrating different products requiring different temperatures.

Heating can be by gas or steam, or a combination in cases where existing boiler capacity is insufficient and gas is needed to supplement the heat supply. Automatic controls are provided to maintain required conditions to close limits. Steam blanching is provided for in the unit.



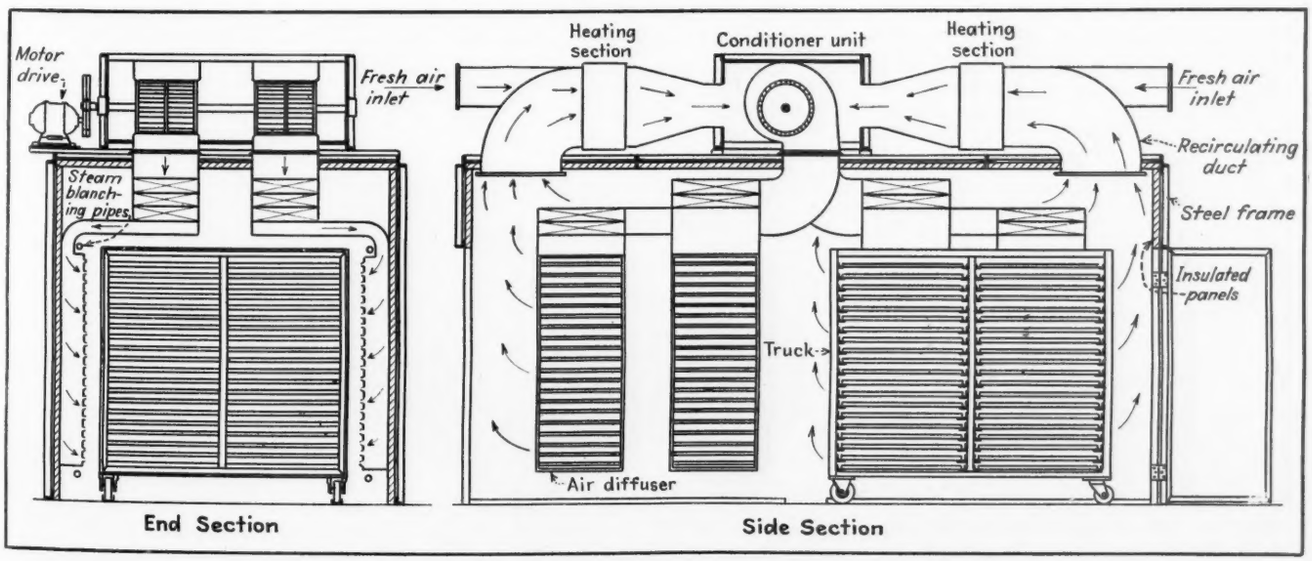
Continuous thickener useful in drying systems, with thickener plate and frame shown unassembled.

Continuous Thickener

FOR thickening, washing and leaching of materials that do not readily settle from a suspending fluid, T. Shriver & Co., Harrison, N. J., has developed a continuous thickener. This device is suitable, for instance, for installation before a dryer, in which location it serves to remove continuously part of the water, thus greatly reducing drying time and cost. In such operations, the thickened slurry can be fed to a dryer, mixer or other equipment by the same pump that operates the thickener.

In construction, this thickener is a modification of a plate and frame filter press. The unit is assembled with adjacent plates and frames, between which are located filter cloths or other filter media. The filter skeleton is filled in the following order: frame, filter medium, plate, filter medium, frame, filter medium, and so on. The assembly is then closed and pressed together just as in the corresponding assembly of a filter press.

The slurry to be thickened is pumped into the unit, reaching the channels



This food dehydrator comes in units and can be used as a single unit holding one truck or as multiple units to form a dehydrating tunnel.

of the frames first. From these channels, a portion of the liquid passes through the filter medium, issuing as a clear liquid that drains away on the plates and thence out of the unit. All of the suspended solids in the original feed remain in the stream of slurry in the frames but, since the end of the spiral or groove in each frame is connected to a common discharge channel, these suspended solids are also continuously discharged from the unit. Discharge of clear liquid from the plates can be through an open or closed delivery system, as desired. Discharge of thickened slurry from the frames is usually through a closed delivery system.

New Blackout Bulb

WABASH APPLIANCE CORP., 335 Carroll St., Brooklyn, N. Y., has made changes in its blackout light bulb. Originally placed on the market in January of this year, the silver lined bulb has been widely tested in practice blackouts. As a result of these tests, the color

New "Blackout Bulb" on right, with former unit on left.

of the light emitted has been changed from blue and red to deep orange, as recommended by the OCD. The new model is also smaller, being reduced to 15 watt size and the built-in reflector has been eliminated. The outside, except for the small area at the bottom from which light is emitted, is coated with a black silicate coating to prevent light leakage. The bulb is said to emit sufficient light to permit people within the lightest space to get around safely, and yet to be effective in a blackout.

Window Protective Coating

TO PREVENT injury caused by flying pieces of glass broken by vibration, which are always responsible for many injuries during air raids, Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J., has brought out "Glasshield," a transparent protective coating for windows.

The makers state that this coating prevents the glass from flying, even if it is broken. They recommend, for maximum protection, two coats on the inside surface and one on the outside. The coatings are brushed on and dry in about one hour. Removal is effected by means of a razor blade. The material is said not to interfere with vision or light transmission through the glass.

Container Sealer

A-B-C PACKAGING MACHINE CO., 219 S. Fourth St., Quincy, Ill., has brought out the Model T201 container sealer for applying adhesives and sealing shipping containers. This unit, said to be quickly adjustable to various sizes, is designed for sealing containers measuring from 6 to 20 in. in width, from 2 to 30 in. in height, and up to 36 in. in length, at a rate of two to fifty cases per minute, depending upon size.

In operation, shipping containers that are to be sealed are placed in the machine by an operator who then trips a mechanism which propels the container through the sealer, where the adhesive is applied and the container is sealed.

This machine has been particularly designed for the use of sodium silicate adhesives. It is also designed to permit the sealing of empty containers when it is desired to seal the empty containers before packing. The complete unit is mounted on casters so that it can be moved from one department to another for packing various goods. It is made in three styles, to seal both top and bottom flaps, top flap only, or bottom flap only.

Vertical Rotary Pump

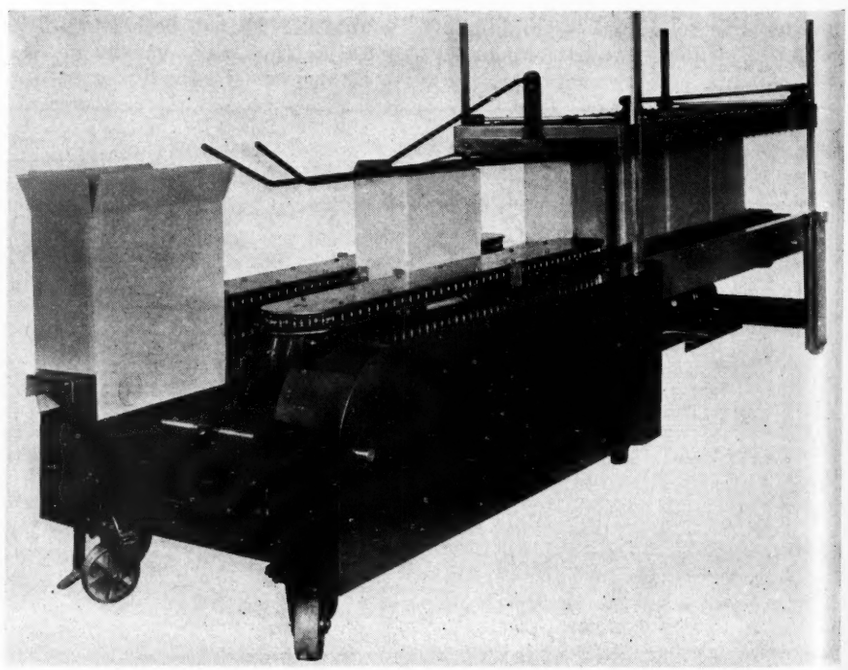
BLACKMER PUMP CO., Grand Rapids, Mich., has adapted its standard design of rotary pump to vertical operation. These vertical units are now available with capacities up to 150 gal. per minute at pressures of 100 lb. per sq.in., powered by a 15 hp. gearhead motor with a speed of 300 r.p.m. on the pump shaft. Other capacities range from 5 to 750 gal. per minute at pressures up to 300 lb. per sq.in. The design is said to be particularly adapted to applications where floor space is limited.

Synthetic Rubber Floats

B. F. GOODRICH CO., Akron, Ohio, has perfected a method of producing hard sponge rubber from its synthetic rubber "Ameripol." This sponge rubber substitute, being resistant to oils, solvents and acids, is said to be particularly suitable for use as a tank float. The material will withstand prolonged exposure to temperatures as high as 158 deg. F., and will not break down under mechanical pressure of 225 lb. per square inch.

Power Distribution

GENERAL ELECTRIC CO., Schenectady, N. Y., has developed the "Load-Center" system of power distribution as a means of saving large quantities of copper and other scarce materials. In this system, power is distributed directly to the production area, or load center, and is there stepped down to the voltage at which it will be used. Small secondary cables then feed the power to motors, lamps and other power utilizing equipment.

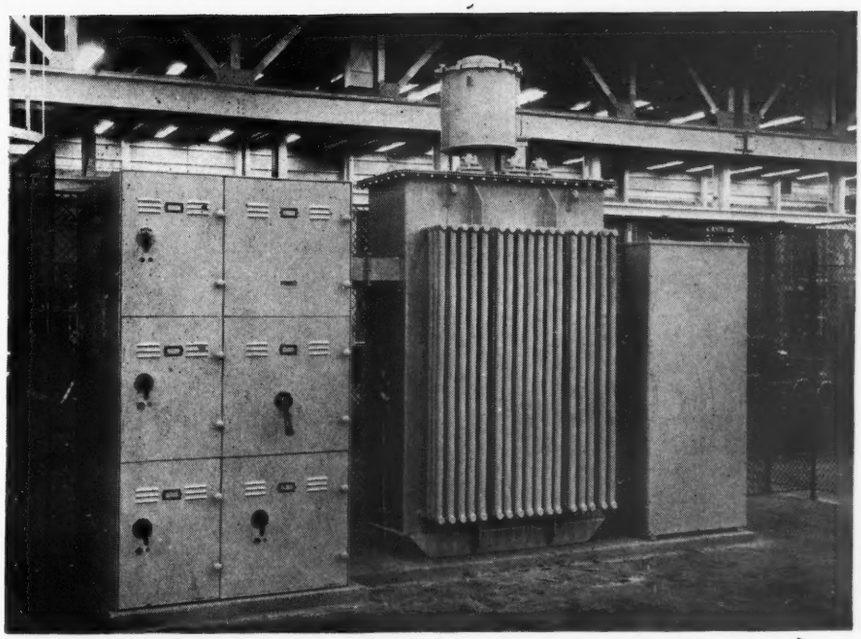


Automatic sealer for applying adhesives and sealing shipping containers.

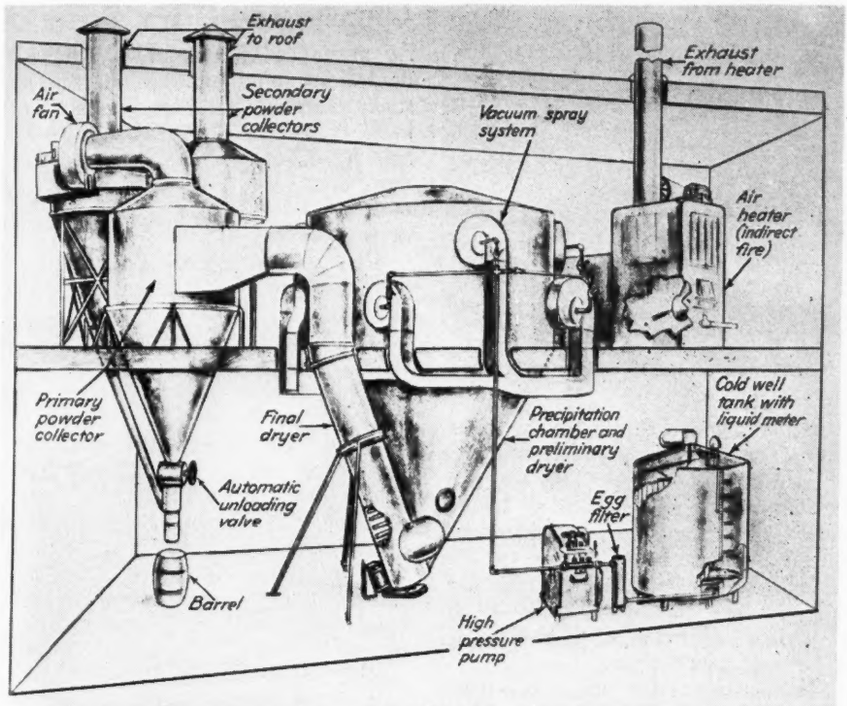
Where the total power load of a plant or building exceeds about 1,000 kva., several small load-center unit substations are used, each placed near the center of its load area. This arrangement thus does away with the high material cost and the voltage drop incidental to long, heavy low voltage circuits.

Other distribution systems usually employ a large substation to transform large blocks of power from high voltage, ranging from 2,300 to 15,000 volts, down to the voltage at which it will be used. Long, heavy, low voltage power cables then distribute the power throughout the factory to where it is to be used.

Load-center power distribution as such is not new. It has been used successfully for some years in the electric utility field. However, the recent development of standard, fully enclosed and protected unit substations, especially designed for installation in production areas, has opened the way to the general use of this materials saving system.



Load-center unit substation, 1,000 kva., 2,400 to 480 volts, installed on a factory floor.



Vacuum spray dehydrating system for dehydrating eggs, milk products, soups, vegetable products, and fruit juices.

Vacuum Spray Dehydrator

Mojonnier Bros. Co., 4601 West Ohio St., Chicago, has developed a vacuum spray dehydrator suitable for dehydrating eggs, milk products, fruit juices, tomato products, vegetable purees, soups and similar liquid or semi-liquid foods.

Referring to the accompanying sketch of this drying system, the product flows from the cold wall mixing tank through the high pressure pump, where it is homogenized and then forced into sprays that atomize the product as it enters the preliminary drying chamber. The atomized particles immediately lose most of their moisture and fall to the bottom. Here the particles go into the final dryer where the last traces of moisture are removed. Heated air is drawn through the entire dehydrating system at high velocity by a fan. The dry powder is collected in the primary powder collector and goes through a rotary valve, then through a sifter and cooler, directly to the package. A small quantity of powder is carried over by the air to the secondary collectors, where it is separated out and delivered to the sifter under the primary powder collector.

Capacity of the units are the evaporation of 330 to 2,650 lb. of water per hour, depending upon which of four sizes is used. The largest size will produce 1,000 lb. per hour of whole egg powder of 5 percent moisture content when starting with liquid eggs that are not precondensed. Capacity for various products can be increased by means of evaporators, vacuum pans or preheaters to effect part of the heating and moisture removal before the product enters the dehydrator.

The drying cycle occupies 3½ seconds. Air used is heated to sterilizing temperature. The manufacturer states that this method of dehydration retains all of the natural flavor and characteristics of the fresh food from which the powder is produced.

Non-Rubber Closure Gasket

Dewey and Almy Chemical Co., Cambridge, Mass., announce a new "Darex" cap compound for gasketing or lining the closures for dry, unprocessed vacuum packs. This compound contains no rubber, no synthetic rubber, no reclaimed rubber and is stated to be made from materials that are not critical today. The compound is nozzle-applied on existing lining machines without any mechanical changes and is then dried in place to become an integral part of the cap.

It is stated by the makers that this new compound is not yet acceptable for processed foods, but for a dry vacuum packed product like coffee it possesses the plastic deformability that gives a tight, positive seal. Production facilities

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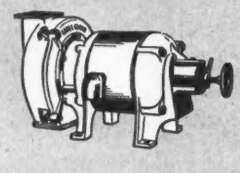

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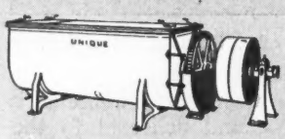

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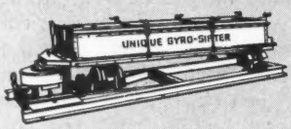

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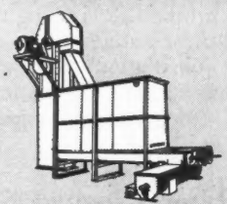

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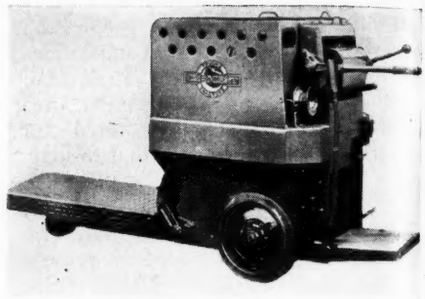

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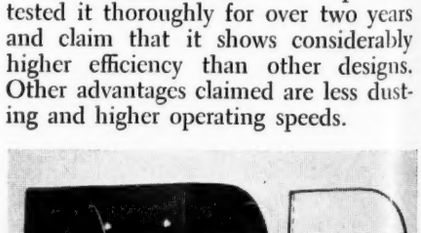
Elevator Cup

AN ELEVATOR CUP for use in handling flour, bran, middlings and other fine or sticky material, has been brought out by B. I. Weller Company, 327 S. La Salle St., Chicago. Designated the Calumet flour cup, this design is an adaptation of the Calumet grain cup made by this same concern.

This new flour cup is designed in the same patented shape as the grain cup, except that it is provided with air vents in the two bottom corners. These vents permit the escape of air when the cup is loading in the elevator boot, thus preventing puffing and blowing of the finely divided material. The holes also prevent suction at the discharge, enabling the cup completely to empty into the discharge spout. The bottom of this new cup is designed in the curve of a logarithmic spiral which follows the natural trajectory taken by material when discharging from an elevator cup moving at high speed. As a result, there is a minimum of friction both in the pick-up and discharge.

The makers of this new cup have tested it thoroughly for over two years and claim that it shows considerably higher efficiency than other designs. Other advantages claimed are less dusting and higher operating speeds.



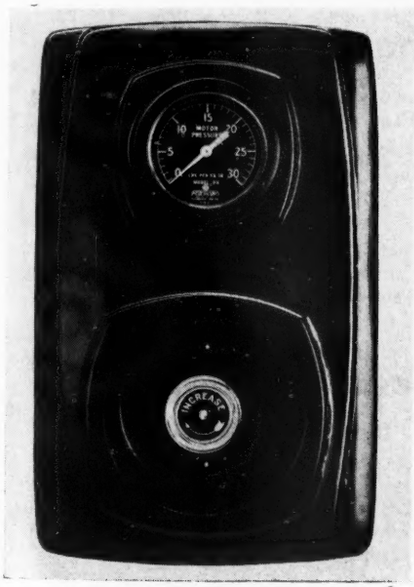
New design of elevator cup for handling flour, bran and similar products.

Collapsible Tube

New England Collapsible Tube Co., New London, Conn., has brought out collapsible tubes made of "Sheffalloy", a metal which does not use tin or aluminum but is said to be made up of less critical metals. The maker states that these tubes are a satisfactory substitute for tubes made of metals normally used for the purpose, having all the characteristics of appearance, pliability and strength customary in this type of container. Where the tubes of the new metal are used with products that are strongly corrosive, an inner tube lining is employed.

Valve Control Unit

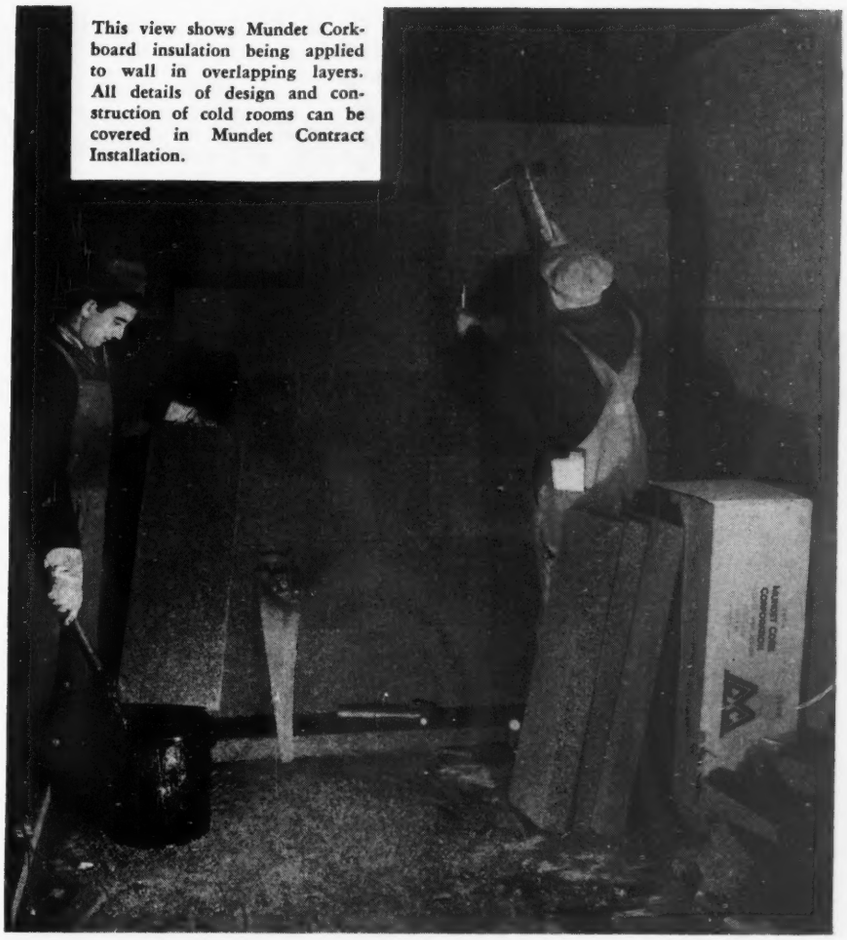
Foxboro Co., Foxboro, Mass., has recently designed a unit for the manual control of remote valves, dampers and other pneumatically operated equipment. This unit has a rectangular case harmonizing with recent designs of recording and controlling instruments. When flush-mounted, its front surface is only 7/16 in. from the surface of the instrument panel. As its setting



Remote valve control unit.

knob and pressure indicator are recessed, there are no protruding parts.

Specifically designed for dead-end service, this remote valve control unit is said to hold reduced pressures dependably to values within very narrow limits. In addition to the use suggested by its name, the device is said to be equally useful in such other applications as the setting of control points for distant instruments, or the adjustment of positioning or pressure reducing pistons located at inaccessible points. It is practicable for operations over distances as great as 1,000 ft.



This view shows Mundet Corkboard insulation being applied to wall in overlapping layers. All details of design and construction of cold rooms can be covered in Mundet Contract Installation.

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Performance records in food plants prove that it pays to specify Mundet Cork Insulation—installed by Mundet contract service—for reliable defense against heat infiltration and for most economical low-temperature control. With our engineering experience and facilities, we are able to assume full responsibility and to guarantee a most satisfactory installation. Mundet Cork Insulation serves for many years at highest efficiency. Its permanency and dependability have been demonstrated in cold storage, quick freezing, air conditioning and other modern applications of refrigeration. Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn, N. Y.

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Here Are Three Practical Developments for Packaging Your Dehydrated and Frozen Foods

As one of the World's Largest Makers of Packaging, we are solving today the new packaging problems of scores of companies. Three basic types of packaging for dehydrated and frozen foods, sketched at the left, can be varied in size and specifications to fit your own particular requirements. Note the main features—

Easy to Open, Easy to Fill, Easy to Close! Semi-floating Construction Eliminates Breakage!

A. **Two-Dimensional Packet**—A "semi-floating" pre-fabricated, duplex, heat-sealing Inner Bag, with heavy-duty casein-coated, sulphite-base Outer Bag.

B. **One-Piece Collapsible Carton**—Tuck, lock or glue end, with duplex, self-opening, "semi-floating," superseal Inner Bag built for heat-sealing.

C. **Two-Piece Collapsible Carton Set**—Outer shell equipped with tuck, lock or glue end. Inner sleeve equipped with duplex, self-opening, "semi-floating," superseal Inner Bag built for heat-sealing.

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BOOKL • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Small Homogenizer—The C y, pilot plant, or commercial d two-stage colloid mill, in th capacities up to 600 gal. pe scribed in 12-page Bulleti lished by Manton-G 7 Charlton St., Ey

Grinding Equip pulverizers and air ing, drying and dustless produ are the subj letin 52, bustion E Branch S

Cutting Cut" r and o crus fo U

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Evaporative Condens tion on Types 9Q1, 9Q 9Q9 evaporative condensers fo systems and for cooling liquids, is published in a series of leaflets by Carrier Corp., Syracuse, N. Y.

Spray Drying Systems—A spray drying system for milk, vegetables and other products is briefly described and illustrated in a 4-page bulletin of Bowen Research Corp., Garwood, N. J.

Variable Speed Drives—The use of "Vari-Pitch Texrope" sheaves for variable speed drives is discussed and specifications of the drives are given in 16-page illustrated Bulletin B6082-A, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Compressors—Horizontal duplex, motor driven, direct connected and belted types of compressors, in sizes from 75 to 3000 hp., are the subject of Bulletin L-675-B1, published by Worthington Pump and Machinery Corp., Harrison, N. J.

Fluorescent Lighting—Cold cathode fluorescent lighting in which the illumination can be provided from tubes as long as 20 ft. or more, either straight or curved, is fully discussed and many installation photographs shown, in four bulletins bound together in a flexible binding, issued by The Swedish Iron and Steel Corp., 17 Battery Place, New York.

Speed Changers—The "Vari-Pitch" speed changer, a speed control for industrial machines, sizes from 1½ to 75 hp., with speed variations in a range up to 375 percent, is described and pictured in Bulletin B6013A, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

tors—Revolving field generators, 7½ 4, 6 or 8 pole, 1,800, 1,200, or 0 cycles (corresponding speeds cies) are described in 4-page BC-A120-80, published Co., 1806 Pine St., St.

H, industrial oil ons requiring bed in Bulle- Engineering York.

and H, combined firing such equip- and kilns, are de- n No. 203 published ng Corp., 580 Fifth

—Direct-connected rotary pacities of 5, 10 and 20 gal. e, for operating pressures up to . per sq.in. are described and illustrated in 4-page Bulletin 110, issued by Blackmer Pump Co., Grand Rapids, Mich.

PLANT SUPPLIES

Material of Construction—A corrosion-resistant alloy steel useful over a wide range of acid and alkaline conditions, called "Worthite," is described in Bulletin W-350-B4A, issued by Worthington Pump & Machinery Corporation, Harrison, N. J.

Metal Products—Wrought iron tubular and hot rolled products, steel tubular products, and alloy steels are described, with specifications, in a 60-page general catalog issued by A. M. Byers Co., Pittsburgh, Pa.

Insulation—"Specifications for Mineral Wool in Low Temperature Installations" is the self-explanatory title of an 8-page technical bulletin issued by Industrial Mineral Wool Institute, 441 Lexington Ave., New York.

Floor Patching Material—A quick hardening iron cement for patching cracks, ruts and shallow holes in concrete floors, called "Smooth-On No. 7B Quick Patch Cement," is described in a folder issued by Smooth-On Mfg. Co., Dept. 417, 570 Communipaw Ave., Jersey City, N. J.

Stainless-Faced Material—"Pluramelt," a metal material for the construction of equipment made by rolling out combination ingots of steel in which one, or two opposite faces, are of stainless steel integrally bonded to ordinary steel, is described in a bulletin entitled "Pluramelt Conserves Vital Alloys," published by Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.

Expansion Joints—A 14-page illustrated bulletin, No. 35-15B, describing Piston-Ring Type, Model A, expansion joints, which can be unpacked and repacked under full pressure, has been issued by American District Steam Co., North Tonawanda, N. Y.

Insulating Materials—A new general catalog containing information and recommendations on both high and low temperature industrial insulating materials, also giving data on refractories, roofing, packings, gaskets and other industrial construction materials, has been issued as a 52-page illustrated catalog, Form GI-6A by Johns-Manville, 22 East 40th St., New York.

Dairy Plant Paint—"Damp-Tex," an acid, alkali and oil proof enamel for dairy plant interiors and equipment, made by Steelcote Mfg. Co., is described in Bulletin Y231, by the distributors, Creamery Package Mfg. Co., 1243 Washington Boulevard, Chicago.

Asphalt Board—A data sheet on the properties of asphalt board in building construction, including its resistance to water, acids, mildew, etc., has been published by Keystone Asphalt Products Co., 43 East Ohio St., Chicago.

Plywood—"The New Resin-Bonded Plywood" is the title of an 8-page folder describing the material and its application in such structures as refrigerated storage rooms, issued by Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.

Speed Indicator—The Reeves electric remote speed indicator for use with Reeves variable speed control equipment, is described in a 4-page illustrated bulletin by Reeves Pulley Co., Columbus, Ind.

Leather Belts—"How to Make Your Belts Last Longer" is the title of a booklet on belt maintenance methods that prolong belt life, issued by E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia, Pa.

Bearings—Installation data on "Compo" oil-retaining bearings, showing approved methods of installation with diagrams and

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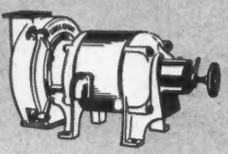

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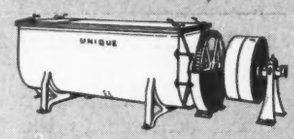

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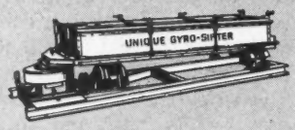

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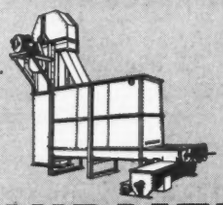

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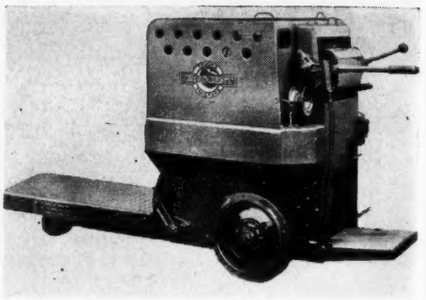

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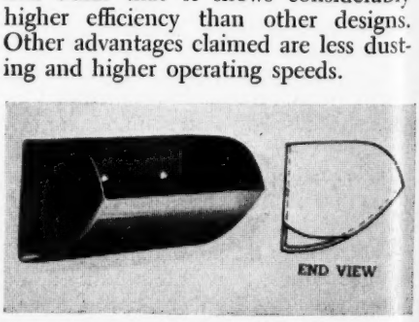
designed for use with 7-in. hand truck skids, is said to replace 3 to 5 hand truckers at an operating cost of one-third of the daily wage of a laborer. The truck is operated by running the platform under the skids. Several pumps on a foot pedal will raise the skids a full 3 in. The load is lowered again by means of a release lever on the dash, controlled by a hydraulic check. The capacity is 2,500 lb.

Elevator Cup

AN ELEVATOR CUP for use in handling flour, bran, middlings and other fine or sticky material, has been brought out by B. I. Weller Company, 327 S. La Salle St., Chicago. Designated the Calumet flour cup, this design is an adaptation of the Calumet grain cup made by this same concern.

This new flour cup is designed in the same patented shape as the grain cup, except that it is provided with air vents in the two bottom corners. These vents permit the escape of air when the cup is loading in the elevator boot, thus preventing puffing and blowing of the finely divided material. The holes also prevent suction at the discharge, enabling the cup completely to empty into the discharge spout. The bottom of this new cup is designed in the curve of a logarithmic spiral which follows the natural trajectory taken by material when discharging from an elevator cup moving at high speed. As a result, there is a minimum of friction both in the pick-up and discharge.

The makers of this new cup have tested it thoroughly for over two years and claim that it shows considerably higher efficiency than other designs. Other advantages claimed are less dusting and higher operating speeds.



New design of elevator cup for handling flour, bran and similar products.

Collapsible Tube

NEW ENGLAND COLLAPSIBLE TUBE CO., New London, Conn., has brought out collapsible tubes made of "Sheffalloy", a metal which does not use tin or aluminum but is said to be made up of less critical metals. The maker states that these tubes are a satisfactory substitute for tubes made of metals normally used for the purpose, having all the characteristics of appearance, pliability and strength customary in this type of container. Where the tubes of the new metal are used with products that are strongly corrosive, an inner tube lining is employed.

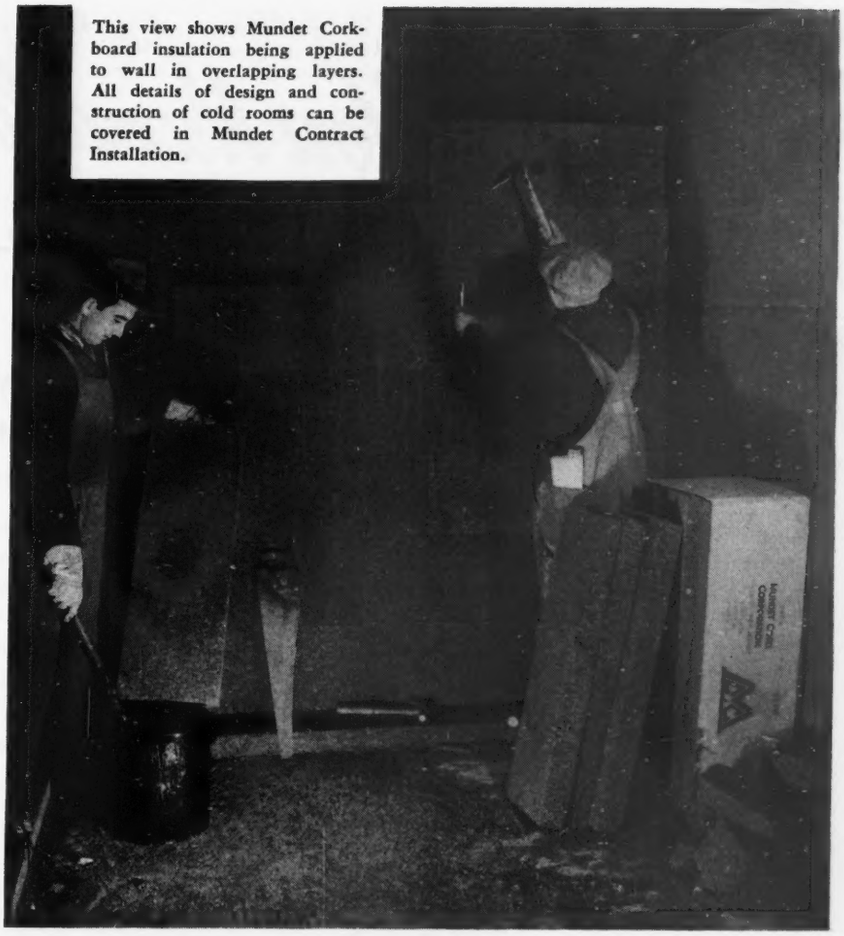
Valve Control Unit

FOXBORO CO., Foxboro, Mass., has recently designed a unit for the manual control of remote valves, dampers and other pneumatically operated equipment. This unit has a rectangular case harmonizing with recent designs of recording and controlling instruments. When flush-mounted, its front surface is only 7/16 in. from the surface of the instrument panel. As its setting

Remote valve control unit.

knob and pressure indicator are recessed, there are no protruding parts.

Specifically designed for dead-end service, this remote valve control unit is said to hold reduced pressures dependably to values within very narrow limits. In addition to the use suggested by its name, the device is said to be equally useful in such other applications as the setting of control points for distant instruments, or the adjustment of positioning or pressure reducing pistons located at inaccessible points. It is practicable for operations over distances as great as 1,000 ft.



This view shows Mundet Corkboard insulation being applied to wall in overlapping layers. All details of design and construction of cold rooms can be covered in Mundet Contract Installation.

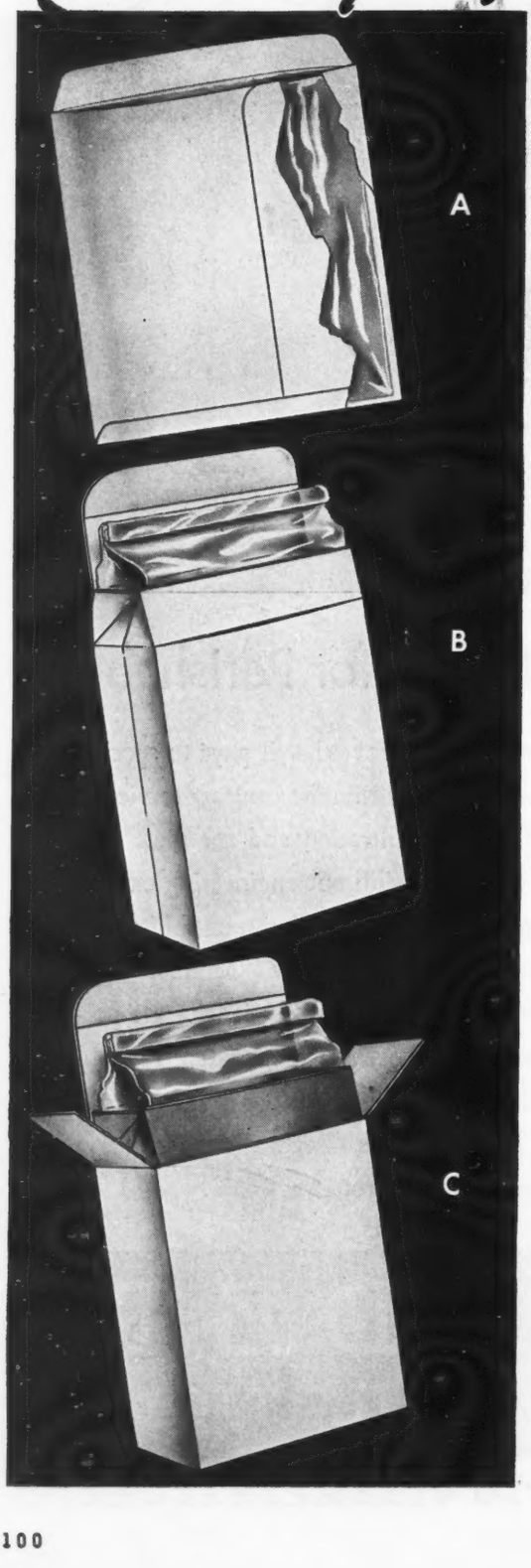
Permanent Protection for Perishables

Performance records in food plants prove that it pays to specify Mundet Cork Insulation—installed by Mundet contract service—for reliable defense against heat infiltration and for most economical low-temperature control. With our engineering experience and facilities, we are able to assume full responsibility and to guarantee a most satisfactory installation. Mundet Cork Insulation serves for many years at highest efficiency. Its permanency and dependability have been demonstrated in cold storage, quick freezing, air conditioning and other modern applications of refrigeration. Mundet Cork Corporation, Insulation Division, 65 South Eleventh Street, Brooklyn, N. Y.

MUNDET
CORK INSULATION

CONSERVES LOW TEMPERATURE

How Are You Handling Your Packaging Change-over?



Here Are Three Practical Developments for Packaging Your Dehydrated and Frozen Foods

As one of the World's Largest Makers of Packaging, we are solving today the new packaging problems of scores of companies. Three basic types of packaging for dehydrated and frozen foods, sketched at the left, can be varied in size and specifications to fit your own particular requirements. Note the main features—

Easy to Open, Easy to Fill, Easy to Close! Semi-floating Construction Eliminates Breakage!

A. **Two-Dimensional Packet**—A "semi-floating" pre-fabricated, duplex, heat-sealing Inner Bag, with heavy-duty casein-coated, sulphite-base Outer Bag.

B. **One-Piece Collapsible Carton**—Tuck, lock or glue end, with duplex, self-opening, "semi-floating," superseal Inner Bag built for heat-sealing.

C. **Two-Piece Collapsible Carton Set**—Outer shell equipped with tuck, lock or glue end. Inner sleeve equipped with duplex, self-opening, "semi-floating," superseal Inner Bag built for heat-sealing.

In Full Color to Speed Your Sales!

The beauty of our Full Color Lithography gives these new packages tremendous eye and sales appeal at the most reasonable cost. Our large selection of fruit and vegetable illustrations in Full Color is available at no extra charge. Our exclusive Full Color "Gang-Runs" save you still more. Write for detailed information and let our packaging engineers help solve your new packaging problems.

FREE — *28-page book "The Value and Patriotic Use of Full Color." Tells how to meet today's selling problems, how to use Full Color; describes our facilities for giving you the finest materials and service. Write for your copy.*

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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Small Homogenizer—The Gaulin laboratory, pilot plant, or commercial homogenizer and two-stage colloid mill, in three sizes with capacities up to 600 gal. per hour, is described in 12-page Bulletin No. 32C, published by Manton-Gaulin Mfg. Co., Inc., 7 Charlton St., Everett, Mass.

Grinding Equipment—"Raymond" mills, pulverizers and air separators, for the grinding, drying and separating operations in the dustless production of powdered materials, are the subject of 8-page illustrated Bulletin 52, Raymond Pulverizer Div., Combustion Engineering Co., Inc., 1315 North Branch St., Chicago.

Cutting Machine—The Model 17 "Roto-Cut" machine for cutting meats, vegetables and other food products without grinding, crushing or chipping, is described in a folder issued by Roto-Cut Corp., 1708 Union Commerce Building, Cleveland, Ohio.

Dust Collectors—A 58-page illustrated catalog of dust collectors, containing specifications and engineering and operating data, has been issued as Catalog No. 72 by American Foundry Equipment Co., Mishawaka, Ind.

Evaporative Condensers—Technical information on Types 9Q1, 9Q2, 9Q6, 9Q7 and 9Q9 evaporative condensers for refrigerating systems and for cooling liquids, is published in a series of leaflets by Carrier Corp., Syracuse, N. Y.

Spray Drying Systems—A spray drying system for milk, vegetables and other products is briefly described and illustrated in a 4-page bulletin of Bowen Research Corp., Garwood, N. J.

Variable Speed Drives—The use of "Vari-Pitch Texrope" sheaves for variable speed drives is discussed and specifications of the drives are given in 16-page illustrated Bulletin B6082-A, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Compressors—Horizontal duplex, motor driven, direct connected and belted types of compressors, in sizes from 75 to 3000 hp., are the subject of Bulletin L-675-B1, published by Worthington Pump and Machinery Corp., Harrison, N. J.

Fluorescent Lighting—Cold cathode fluorescent lighting in which the illumination can be provided from tubes as long as 20 ft. or more, either straight or curved, is fully discussed and many installation photographs shown, in four bulletins bound together in a flexible binding, issued by The Swedish Iron and Steel Corp., 17 Battery Place, New York.

Speed Changers—The "Vari-Pitch" speed changer, a speed control for industrial machines, sizes from 1½ to 75 hp., with speed variations in a range up to 375 percent, is described and pictured in Bulletin B6013A, published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Generators—Revolving field generators, 7½ to 75 kva., 4, 6 or 8 pole, 1,800, 1,200, or 900 r.p.m., 60 cycles (corresponding speeds for other frequencies) are described in 4-page illustrated Bulletin BC-A120-80, published by Century Electric Co., 1806 Pine St., St. Louis, Mo.

Oil Burners—Types A and H, industrial oil burners designed for installations requiring a wide capacity range are described in Bulletin No. 108, issued by Peabody Engineering Corp., 580 Fifth Ave., New York.

Fuel Burners—Types A and H, combined gas and oil burners, for firing such equipment as boilers, ovens and kilns, are described in 4-page Bulletin No. 203 published by Peabody Engineering Corp., 580 Fifth Ave., New York.

Rotary Pumps—Direct-connected rotary pumps, in capacities of 5, 10 and 20 gal. per minute, for operating pressures up to 100 lb. per sq.in. are described and illustrated in 4-page Bulletin 110, issued by Blackmer Pump Co., Grand Rapids, Mich.

PLANT SUPPLIES

Material of Construction—A corrosion-resistant alloy steel useful over a wide range of acid and alkaline conditions, called "Worthite," is described in Bulletin W-350-B4A, issued by Worthington Pump & Machinery Corporation, Harrison, N. J.

Metal Products—Wrought iron tubular and hot rolled products, steel tubular products, and alloy steels are described, with specifications, in a 60-page general catalog issued by A. M. Byers Co., Pittsburgh, Pa.

Insulation—"Specifications for Mineral Wool in Low Temperature Installations" is the self-explanatory title of an 8-page technical bulletin issued by Industrial Mineral Wool Institute, 441 Lexington Ave., New York.

Floor Patching Material—A quick hardening iron cement for patching cracks, ruts and shallow holes in concrete floors, called "Smooth-On No. 7B Quick Patch Cement," is described in a folder issued by Smooth-On Mfg. Co., Dept. 417, 570 Communipaw Ave., Jersey City, N. J.

Stainless-Faced Material—"Pluramelt," a metal material for the construction of equipment made by rolling out combination ingots of steel in which one, or two opposite faces, are of stainless steel integrally bonded to ordinary steel, is described in a bulletin entitled "Pluramelt Conserves Vital Alloys," published by Allegheny Ludlum Steel Corporation, Pittsburgh, Pa.

Expansion Joints—A 14-page illustrated bulletin, No. 35-15B, describing Piston-Ring Type, Model A, expansion joints, which can be unpacked and repacked under full pressure, has been issued by American District Steam Co., North Tonawanda, N. Y.

Insulating Materials—A new general catalog containing information and recommendations on both high and low temperature industrial insulating materials, also giving data on refractories, roofing, packings, gaskets and other industrial construction materials, has been issued as a 52-page illustrated catalog, Form GI-6A by Johns-Manville, 22 East 40th St., New York.

Dairy Plant Paint—"Damp-Tex," an acid, alkali and oil proof enamel for dairy plant interiors and equipment, made by Steelcote Mfg. Co., is described in Bulletin Y231, by the distributors, Creamery Package Mfg. Co., 1243 Washington Boulevard, Chicago.

Asphalt Board—A data sheet on the properties of asphalt board in building construction, including its resistance to water, acids, mildew, etc., has been published by Keystone Asphalt Products Co., 43 East Ohio St., Chicago.

Plywood—"The New Resin-Bonded Plywood" is the title of an 8-page folder describing the material and its application in such structures as refrigerated storage rooms, issued by Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.

Speed Indicator—The Reeves electric remote speed indicator for use with Reeves variable speed control equipment, is described in a 4-page illustrated bulletin by Reeves Pulley Co., Columbus, Ind.

Leather Belts—"How to Make Your Belts Last Longer" is the title of a booklet on belt maintenance methods that prolong belt life, issued by E. F. Houghton & Co., 303 West Lehigh Ave., Philadelphia, Pa.

Bearings—Installation data on "Compo" oil-retaining bearings, showing approved methods of installation with diagrams and

PROTECTION AGAINST MOISTURE LOSS

Not only do Bemis Waterproof Bags protect against moisture from without, but they can be made to prevent escape of desirable moisture from within. Products which tend to dry out en route or in storage are now giving complete satisfaction to users through shipment in Bemis Waterproof Bags.

These time-tested and proven shipping containers also can be made to retain desirable aromas and repel objectionable odors—shut out dust and dirt—resist acids and grease. And because of their strength and toughness, Bemis Waterproof Bags provide extra protection against rough handling.

WATERPROOF DEPARTMENT

BEMIS BRO. BAG CO.

ST. LOUIS, MO. • BROOKLYN, N. Y.

details of tools are given in an 8-page bulletin issued by Bound Brook Oil-less Bearing Co., Bound Brook, N. J.

Dairy Plant Floors—"CP" emery aggregate for new floors in dairy products manufacturing plants, and for patching, resurfacing or rebuilding worn floors, is described in 12 page Bulletin W-761, published by Creamery Package Mfg. Co., 1243 Washington Boulevard, Chicago.

Anniversary—"Fifty Years of Chemical Progress" is the title of an interesting 46-page brochure published by The Mathieson Alkali Works, 60 East 42nd St., New York.

CONTROL EQUIPMENT

Pressure Recorders—A full line of pressure recording instruments for all types of industrial operations is described in a 32-page illustrated catalog, No. 22-A, published by The Foxboro Co., Foxboro, Mass.

Glass Pack Processing Control—For those who are shifting from packing in tin to packing in glass, a system of automatic control for sterilizing retorts for glass containers is described in Bulletin No. 1198A by C. J. Tagliabue Mfg. Co., Park & Nostrand Ave., Brooklyn, N. Y.

PACKAGING

Labeling Machines—The new World "Uni-Turret" and "Twin-Turret" automatic labeling machines for labeling glass containers from 6 oz. to 1 qt. sizes are briefly discussed in illustrated leaflets published by Economic Machinery Co., Worcester, Mass.

Packaging—Vol. 1, No. 1 of a new house magazine, "The Package Engineer," has been issued by Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.

MISCELLANEOUS

Hand Refractometer—An instrument for field examination of liquid extracts, such as from grapes, berries, beets, sugar-cane, citrus fruits and tomatoes, also for the maple sirup industry and for control work in jam, jelly and preserve manufacture, is described in a leaflet issued by Bausch & Lomb Optical Co., Rochester, N. Y.

Boiler Operation—"How to Safely Stretch Steaming Capacity" is the title of a bulletin giving suggestions as to how to get the maximum safe steam output from boilers to meet increased production demands, issued by Bailey Meter Co., 1070 Ivanhoe Road, Cleveland, Ohio.

Vitamin Testing—A technical publication entitled "Notes on Methods and Equipment for the Fluorometric Assay of Vitamins B" has been issued as Bulletin T-108 by Coleman Electric Co., Inc., 318 Madison St., Maywood, Ill.

BOOKS

Food Law Treatise

THE LAW OF FOODS, DRUGS AND COSMETICS. By Harry Aubrey Toulmin, Jr. Published by The W. H. Anderson Co., 524 Main St., Cincinnati, Ohio, 1942. 1422 pages; 7x10 in.; cloth. Price, $17.50.

In this large volume are analyzed, annotated and explained the Federal Food, Drug and Cosmetic Act and related regulatory statutes, both state and federal. The volume is divided into these sections: Public Policy and History; Purpose Scope and Constitutionality; Definitions; Prohibited Acts; Enforcement; Food; Drugs and Devices; Cosmetics; Administration of Act; Imports and Exports; Wheeler-Lea Act; Anti-trust and Related Acts; State Food and Drug Acts; Patents and Trade Marks; Related Food and Drug Acts; Appendices; General Index; Tables of Cases; Forms, Bibliography.

The volume includes extensive excerpts from a monograph on administrative and enforcement procedure, prepared by two members of the Food and Drug Administration, and a flow sheet of enforcement procedure from the same source. The book also includes trade correspondence rulings, administrative charts, official regulations, summaries of judgments, typical FDA rulings and forms of practice.

The work is to be kept up to date by means of annual cumulative pocket supplements containing the latest rulings and decisions, as well as all amendments to the various laws. There will be a nominal charge of "probably not more than $5 a year," for the continuing service.

Vitamin Technology

CHEMISTRY AND PHYSIOLOGY OF THE VITAMINS, By H. R. Rosenberg. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y., 1942. 674 pages; 6¼x9¼ in.; cloth. Price, $12.

This is a highly technical, carefully written book, showing the results of many years work in its preparation. Each vitamin is discussed separately, emphasis being laid upon the chemistry and the physiological aspects of the compounds. The vitamins are presented according to the alphabetical order of nomenclature, this arrangement following in general the incidental discoveries of the vitamins.

Procedures for isolation and synthesis are given, as well as chemical and biological tests for the determination of vitamins. Much space is devoted to the question of chemical constitution. Brief paragraphs outline the industrial preparation of each vitamin. The relation of each vitamin to other vitamins, to hormones and to the inorganics is presented. This is followed by a short review of the present-day knowledge of the pathological aspects, and of vitamin requirements.

The book ends with a very good list of patents and abstracts of these patents, not only those issued in the United States, but for Great Britain, Germany and France. The book also includes several thousand literature references.

Eastern Peaches

VARIETAL SUITABILITY AND METHODS OF HANDLING EASTERN-GROWN PEACHES FOR CANNING. By Joseph C. Caldwell. Published by The U. S. Department of Agriculture (Bureau of Plant Industry), 1942. 10 sheets; 8x10¼ in. Free.

This is a mimeographed bulletin bringing together all of the information accumulated by the Bureau of Plant Industry in its studies of canning quality in Eastern-grown peaches. It contains new information, as well as data from earlier reports now out of print. Canners handling these peaches will find the material of practical value to them in this season's operations.

Nutrition Values

FOOD VALUES IN SHARES AND WEIGHTS, By Clara Mae Taylor. Published by The Macmillan Co., 60 Fifth Ave., New York, N. Y., 1942. 92 pages; 7¼x9¾ in.; cloth. Price $1.50.

The nutritive values of approximately 500 common foods and prepared dishes are given in the tables of this book. And recommended daily allowances for specific nutrients are given in both shares and weights. With the emphasis being put on nutrition under the war program, these data should be useful to commercial food packers.

Water Purification

TASTE AND ODOR CONTROL IN WATER PURIFICATION. Published by the Industrial Sales Division of West Virginia Pulp and Paper Co., 230 Park Ave., New York, N. Y., 1942. 92 pages; 6x9 in.; paper. Free.

Because of the importance of pure water without taste or odor which affects the product, food processors will find useful information in this publication. Much of the book is devoted to the use of activated carbon for taste and odor control, but there is also a section on other methods of control, including the chlorine-ammonia treatment, super-chlorination, the use of ozone and the use of potassium permanganate. The work contains helpful tables, diagrams, photographs and photomicrographs.

Dehydration and Vitamins

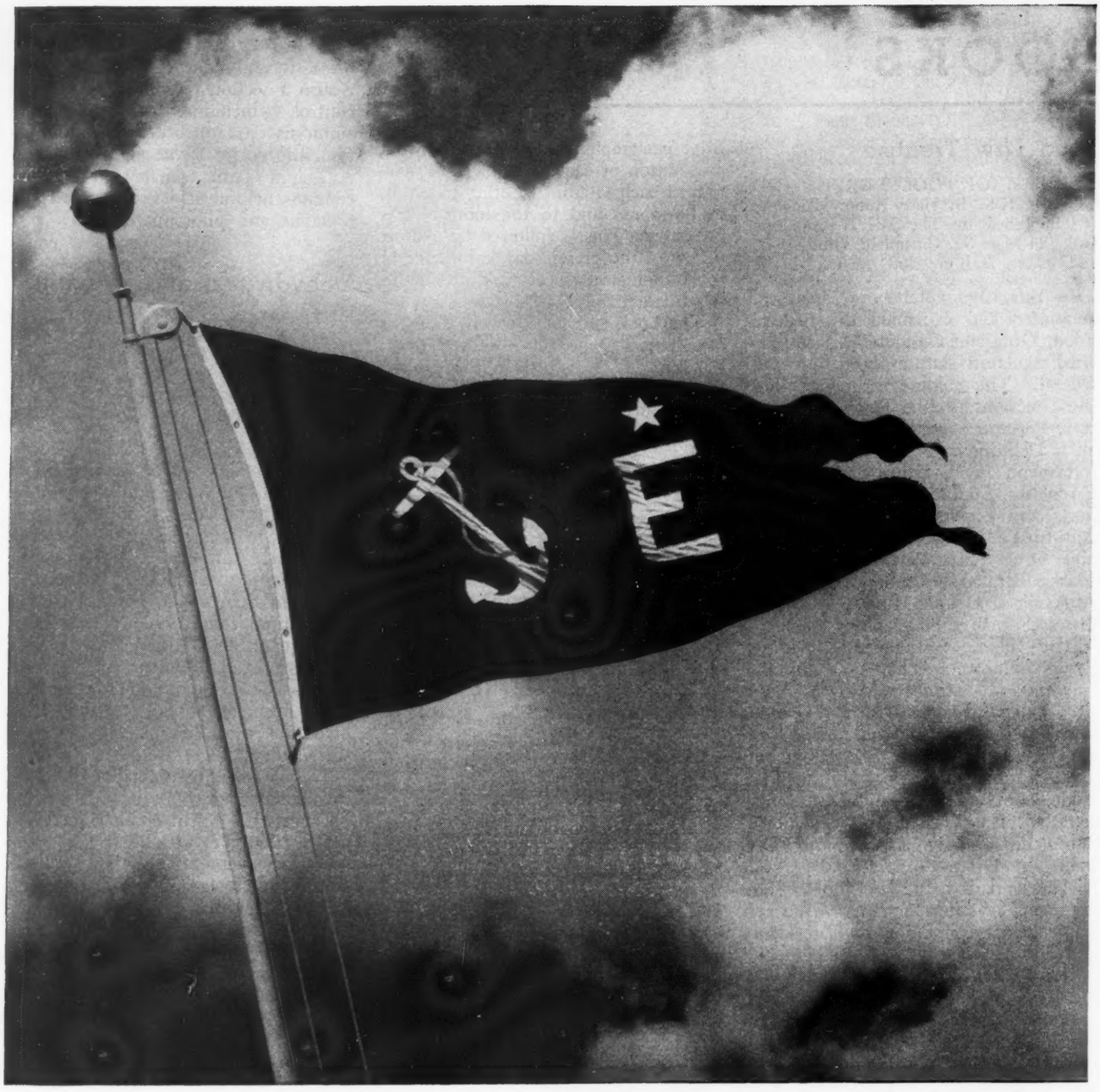
NUTRITIVE VALUE OF DRIED AND DEHYDRATED FRUITS AND VEGETABLES. By Donald K. Tressler. Published by New York State Agricultural Experiment Station, Geneva, N. Y., as Technical Bulletin No. 262, 1942. 44 pages; 5¾ x 8¾ in.; paper. Free.

Much remains to be learned about drying (sun drying) and dehydrating fruits and vegetables, and even more is unknown about their nutritive values. And these problems are becoming urgent with the sudden increased demand for dehydrated products created by wartime conditions. Not only are large quantities of dried foods wanted for Lease-Lend shipment and for feeding armed forces, but the tin shortage is causing many canners to turn to dehydration as a means of preserving their products.

In view of this imperative need for more knowledge about dehydration and its effects on nutritive values, a review of the literature on the subject takes on particular importance. This bulletin constitutes such a review. It covers briefly the processes employed in manufacturing commercially important dried fruits and vegetables and the nutritive values of these products. At the end of the bulletin is an extensive bibliography.

The author points out that dehydrated vegetables produced during World War I were not only lacking in palatability, but also rapidly lost all or nearly all of their content of vitamin C and carotene, the precursor of vitamin A. Dehydration research during the past 25 years has indicated the necessity of inactivating the enzymes of vegetables by scalding, or by some other means, prior to dehydration in order to obtain vegetables of good palatability, high vitamin content and good keeping quality. Recently, it has been found that vegetables retain their vitamin C well if stored in the absence of air. It is probable that storage in an inert atmosphere aids also in the retention of carotene.

Dehydrated fruits retain vitamins, particularly carotene and vitamin C, much better than those which are sun dried. Sulphuring of fruits aids in the retention of vitamin C but causes almost complete destruction of the vitamin B_1 content.



A New Star over America

THIS is the new All-Navy "E" burgee. With its added star, it signifies that, for a period of over six months, production of Navy material has been apace of schedule. First flown in America over the Bausch & Lomb plant, it is official Navy recognition to B&L workers of their continued achievement in Production for Victory. It replaces the Bureau of Ordnance flag and "E" pennant awarded Bausch & Lomb July 25, 1941.

The Navy "E" has always been an honor to be striven for, to be guarded jealously. On gun turret, battleship funnel, or the flagstaff of an industrial plant, it is a symbol of championship performance. But today, Navy officials—and the American public—are anxious to see this award in as many places as possible. Because "championship performance" is what America needs today—all down the line.

Workmen at Bausch & Lomb are devoting to the specific implements of war, the experience and skills gained in the production of scientific optical instruments. Today the world depends on America's men-behind-the-men-behind-the-guns to destroy the forces of aggression—that the ideals of individual freedom may survive.

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PATENTS

Cocoa Nibs Subjected to Increased Temperature and Gas Pressure With Subsequent Sudden Release of Pressure and Cooling Preparatory to Roasting—Albert Musher, New York, N. Y., to Food Manufacturing Corp., Chicago, Ill. No. 2,278,471. April 7, 1942.

Foods Slowly Frozen Preliminary to Dehydration and Subjection to Elevated Pressure With Subsequent Sudden Release of Pressure to Form Unexpanded Structure But Disrupted Final Product—Albert Musher, to Musher Corp., New York, N. Y. No. 2,278,472. April 7, 1942.

Coffee Beans Subjected to Steam at Increased Temperature and Pressure Followed by Sudden Release of Pressure and Lowering of Temperature to Disrupt Coffee Bean Structure—Albert Musher, to Musher Corp., New York, N. Y. No. 2,278,473. April 7, 1942.

Tea Leaves Converted Into Expanded, Steam-exploded, Unrolled State by Subjection to Steam and Elevated Temperature and Pressure With Sudden Release of Pressure and Lowering of Temperature—Albert Musher, New York, N. Y., to Food Manufacturing Corp., Chicago, Ill. No. 2,278,474. April 7, 1942.

Beans Given Baked Flavor by Subjection to Steam at Elevated Temperature and Pressure Followed by Sudden Releasing of Pressure and Lowering of Temperature Preliminary to Blanching and Canning of Beans—Albert Musher, New York, N. Y., to Food Manufacturing Corp., Chicago, Ill. No. 2,278,475. April 7, 1942.

Lean Animal Meat Disrupted in Structure by Drying, Subjecting to Steam at Elevated Temperature and Pressure and Exploding by Sudden Release of Pressure and Lowering of Temperature—Albert Musher, New York, N. Y., to Food Manufacturing Corp., Chicago, Ill. No. 2,278,476. April 7, 1942.

Cacao Beans Prepared for Crushing by Subjection to Superheated Steam and Superatmospheric Pressure for About 50 Seconds to Loosen Shells, With Subsequent Sudden Release of Pressure and Lowering of Temperature—William J. Plews, Chicago, Ill., to Food Manufacturing Corp. No. 2,278,483. April 7. 1942.

Green and Yellow Peas Converted to Instantly Water-absorbent and Water-wettable Powder as a Result of Steam Explosion—William J. Plews, Chicago, Ill., to Food Manufacturing Corp. No. 2,278,484. April 7, 1942.

Fruits and Vegetables in Open Boxes Given Uniform Coloring Treatment by Stacking in Coloring Room With False Floor to Permit Ready Circulation of Coloring Gases—Bronson C. Skinner, Dunedin, Fla. No. 2,278,571. April 7, 1942.

Lollipop Confections Formed on Flexible Handles Cut, Shaped and Inserted Into Molds by Mechanical Means—Carl W. Spohr, Chicago, and Robert F. Bracke, Arlington Heights, Ill., to Saf-T-Pop Corp., Dubuque, Iowa. No. 2,278,574. April 7, 1942.

Protein Concentrate Prepared From Soybeans—Philip Rauer, New York, N. Y. No. 2,278,670. April 7, 1942.

Soft-shell Nuts Subjected to Steam at Elevated Temperature and Pressure With Subsequent Sudden Release of Pressure, Lowering of Temperature and Disruption of Shell, Kernel and Germ of Nut—Albert Musher, to Musher Corp., New York, N. Y. No. 2,278,941. April 7, 1942.

Olives Dried, Subjected to Steam at Increased Temperature and Pressure, Followed by Sudden Release of Pressure and Lowering of Temperature for Disruption of Structure and Breaking of Oil Cells—Albert Musher, New York, N. Y., to Food Manufacturing Corp., Chicago, Ill. No. 2,278,942. April 7, 1942.

Salt Grained in Machine With Downwardly Tapering Intermediate Portion Having Less Cross-sectional Area Than Top Portion—Clinton S. Robison, Chicago, Ill. No. 2,279,061. April 7, 1942.

Meat Sliced and Slitted in Two-step Operation by Mechanical Means—Joseph P. Spang, Quincy, Mass., to Cube Steak Machine Co., Inc., Boston, Mass. Nos. 2,279,071 and 2,279,072. April 7, 1942.

Grated Cheese Particles With Normal Commercial Moisture Content Given Fat Protective Coating—Albert Musher, to Musher Corp., New York, N. Y. No. 2,279,202. April 7, 1942.

Ice Cream Mixture Made to Contain Crisp, Butter-coated Corn Flakes—Albert Musher, to Musher Corp., New York, N. Y. No. 2,279,203. April 7, 1942.

Milk Coagulated, Separated Into Whey and Coagulum, and Coagulum Emulsified in Water by Use of Fused Mixture of Disodium Phosphate, Sodium Sesquicarbonate and Citric Acid Preparatory to Making of Ice Cream—Clinton H. Parsons and Everette C. Scott, to Industrial Patents Corp., Chicago, Ill. No. 2,279,205. April 7, 1942.

Peas and Beans Cooked To Soften Cell Walls, Dried to Firm Structure and Disrupted by Subjecting to Steam at Elevated Temperature and Pressure, Followed by Instant Release of Pressure With Lowering of Temperature—Albert Musher, to Musher Corp., New York, N. Y. No. 2,279,280. April 7, 1942.

Biscuits Cut and Panned by Mechanical Device Equipped With Die Having Plurality of Spaced Openings—Walter A. Thum, to Papendick, Inc., St. Louis, Mo. No. 2,279,420. April 14, 1942.

Cereal-puffing Gun Designed To Mechanically Release Closing Means by Upward Movement of Gun Barrel—Howard L. Hayden, Minneapolis, Minn., to General Mills, Inc. No. 2,279,868. April 14, 1942.

pH of Fresh-fish Viscera Containing Vitamin-bearing Oil Increased to More Than 9.0 to Inhibit Deterioration—Robert H. Bedford, to Atlantic Coast Fisheries Co., New York, N. Y. No. 2,280,024. April 14, 1942.

Leavened Bread Made by Incorporating Cystine as Ingredient Prior to Fermenting of Dough—Frederick C. Weber, Eastchester, N. Y., to Keratene Co., Winsted, Conn. No. 2,280,031. April 14, 1942.

Potatoes Sliced by Mechanical Means at Low Production Rate—Donald A. Barnes, Akron, Ohio. No. 2,280,053. April 21, 1942.

Bread Sliced in Machine With Gravity Feed and Discharge—Morris Brustowsky, Brooklyn, N. Y., to U. S. Slicing Machine Co., La Porte, Ind. No. 2,280,059. April 21, 1942.

Solids-containing Liquids Dried by Three-step Spraying Procedure in Which Same Stream of Air Circulates Continuously in Closed Circuit to Third, Second and First Drying Compartments—Joseph M. Hall, Chicago, Ill. No. 2,280,073. April 21, 1942.

Cold, Raw Juices of Sugar Sorghum Centrifuged for Removal of 70 Percent of Original Starch Content Preparatory to Making Sucrose and Molasses—Emil K. Ventre, Baton Rouge, La., and Howard S. Paine, Chevy Chase, Md., to Secretary of Agriculture of the United States of America. No. 2,280,085. April 21, 1942.

Egg Whites Acidified and Subjected to Bacterial Fermentation Preparatory to Drying—Norman C. Fischer, Springfield, Mo., to Armour and Co., Chicago, Ill. No. 2,280,147. April 21, 1942.

Doughnuts Formed, Discharged Into Cooking Fat and Moved Through Cooker in Continuous Mechanized Manner—Stephen A. Gardner, to Dough-King, Inc., Minneapolis, Minn. No. 2,280,148. April 21, 1942.

Nut Meats Chopped in Manually Operated Machine—Rudolph Bernhardt, Chicago, Ill. No. 2,280,211. April 21, 1942.

Grinding and Separating Carried on in Combination Unit—Samuel B. Kanowitz, to Combustion Engineering Co., Inc., New York, N. Y. No. 2,280,238. April 21, 1942.

Pie Crust Formed and Placed in Pan by Mechanical Unit Actuated Pneumatically—Oliver H. Tracy, Portland, Ore. No. 2,280,324. April 21, 1942.

Bottled Fruit Juice Beverages Made by Using Pre-gassed Water—Willard E. Baier, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,280,365. April 21, 1942.

Starch Purified of Its Fatty Acid Content Without Hydrolosis of Starch—Thomas John Schoch, to Corn Products Refining Co., New York, N. Y. No. 2,280,723. April 21, 1942.

Foodstuffs Encased in Thin, Flexible and Impervious Rubber Casing Preparatory to Freezing—John Charles Hoveman, Paris, France, to Dewey and Almy Chemical Co., Cambridge, Mass. No. 2,280,827. April 28, 1942.

Animal and Vegetable Oils Deodorized in a Continuous Process—Dion K. Dean, Rahway, N. J., to Foster Wheeler Corp., New York, N. Y. No. 2,280,896. April 28, 1942.

Cheese, Butter and Like Packaged in Unfolded Container by Mechanical Operations—Arthur B. Erekson, Plymouth, Wis., to Borden Co., New York, N. Y. No. 2,280,904. April 28, 1942.

Sugar Recovered From Molasses by Liming Solution at Below 35 Deg. C. and Heating to Not Over 35 Deg. C. by Direct Introduction of Steam Preparatory to Filtering—Roy H. Cottrell and Vernal Jensen, Ogden, Utah. No. 2,281,025. April 28, 1942.

Corn Dried in Unit Equipped With Air-flow Control—Timothy J. Costello, St. Paul, Minn. No. 2,281,269. April 28, 1942.

Milk Filtered Cold Through Series of Laterally Assembled Units—George J. Polivka, La Grange, Ill. No. 2,281,454. April 28, 1942.

Yeast Grown in Wort Under Controlled Aeration—Sven Olof Rosenquist, Rotebro, Sweden, to Svenska Jästfabriks, Aktiebolaget, Stockholm, Sweden. No. 2,281,457. April 28, 1942.

Fats and Oils Hydrolized by Steam Under Greater than Atmospheric Pressure and at Elevated Temperatures To Produce Fatty Acids and Concentrated Glycerine—Warren Davey, Montclair, and Martin Hill Ittner, Jersey City, N. J., to Colgate-Palmolive-Peet Co., Jersey City, N. J. No. 2,281,534. April 28, 1942.

Contents of Container Mixed by Oscillating Movement During Passage Through Agitating Machine—James Kantor, to Liquid Carbonic Corp., Chicago, Ill. No. 2,281,540. April 28, 1942.

Chocolate Melting Point Raised by Hydrogenating at From 100 Deg. C. to 150 Deg. C.—Frederic H. Penn, Dallas, Tex. Re-issue No. 22,089. May 5, 1942.

Tea and Other Flavor-imparting Materials Packaged in Heat-sealing Sheet Material Having a Filter Layer Base—Hans O. Irmscher, Roslyn, N. Y., to Millie Patent Holding Co., Inc. No. 2,281,582. May 5, 1942.

Fatty and Lean Meat Constituents Separated by Hashing and Submerging in Large Quantity of Water Cooled to Approach Freezing to Float Fatty Particles—Lowell R. Newton, to Industrial Patents Corp., Chicago, Ill. No. 2,281,590. May 5, 1942.

Animal Tissue Separated Into Fatty and Gelatine Stock by Hashing, Cutting and Scraping to Free Fatty Particles for Separation by Flotation—Charles T. Walter, to Industrial Patents Corp., Chicago, Ill. No. 2,281,609. May 5, 1942.

Fruits and Vegetables Colored by Treatment With Live-steam-heated Gases in Air tight Room Under Control to Prevent Exceeding Predetermined Maximum Temperature—Bronson C. Skinner, Dunedin, Fla. No. 2,281,625. May 5, 1942.

Carbonated Beverage Ingredients Mixed in Sealed Bottle in Upright Position by Spinning at Relative High Rate of Speed—George W. Newton, to Crown Cork & Seal Co., Inc., Baltimore, Md. No. 2,281,791. May 5, 1942.

Dough Sheets Straightened by Mechanical Means Preparatory to Coiling—Albert O. Riordan, to Baker Perkins, Inc., Saginaw, Mich. No. 2,281,802. May 5, 1942.

Glyceride Oils Containing Vitamin A Protected Against Oxidation Without Actual Mixing of Protecting Agent—Kenneth C. D. Hickman and James G. Baxter, to Distillation Products, Inc., Rochester, N. Y. No. 2,282,054. May 5, 1942.

IN FLOUR MILL buildings of all types, housing from one to three milling units of widely-varying capacities and utilizing equipment made by many different manufacturers, the MACHINERY PIPING SYSTEM (MPS), plus liquid hydrocyanic acid (HCN) applied by Industrial Fumigation Engineers (IFE), "adds up" to economical, rapid, practically 100% extermination of insect pests in all stages of their life cycles.

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Bread Loaves Held Under Position Control During Passage Through Wrapping Machine—William Hoppe, to National Bread Wrapping Machine Co., Springfield, Mass. No. 2,281,936. May 5, 1942.

Beverage Extract Made by Subjecting Original Material to Repeated Extraction Under Counter-current Principle—John L. Kellogg, to Helen L. Kellogg, Chicago, Ill. No. 2,282,138. May 5, 1942.

Roasted Coffee Treated With Insoluble Converting Enzyme to Aid in Making Coffee Extract—John L. Kellogg, to Helen L. Kellogg, Chicago, Ill. No. 2,282,139. May 5, 1942.

Liquids in Containers Pasteurized During Travel Through Compartment Under Successive Sprays of Heated Water—James L. Herold and William J. Nekola, St. Louis, and Frederick W. Wehmiller, Ladue, Mo., to Barry-Wehmiller Machinery Co., St. Louis, Mo. No. 2,282,187. May 5, 1942.

Corn Extracted in Series of Horizontal Units Each Having Lower Mixing Zone and Upper Settling Zone, Agitators in Mixing Zone, and Connecting Openings at Level Below Settling Zones—Lloyd C. Swallen, Argo, Ill., and Harold Reintjes, Berwyn, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,282,265. May 5, 1942.

Juices Extracted From Citrus Fruits by Automatic Mechanical Means Without Deterioration of Natural Color, Flavor, Aroma and Nutritive Values—Ralston R. Smith, Vallejo, Calif. No. 2,274,306. Feb. 24, 1942.

Flavoring Sirups Incorporated Into Semi-frozen Ice Cream in Continuous Manner by Mechanical Means—Abram E. Hershey to Hershey Creamery Co., Harrisburg, Pa. No. 2,282,313. May 12, 1942.

Enzymes Recovered From Concentrated Clarified Koji Solution—Katsuhei Miyamoto, New York, N. Y., to Frederick Stearns and Co., Detroit, Mich. No. 2,282,492. May 12, 1942.

Food Chopped Into Small Particles During Passage Through Grinding Machine Operating in Vertical Plane—Alexander F. Kaptuller, Chicago, Ill. No. 2,282,521. May 12, 1942.

Cream and Similar Fluids Quick Frozen While Passing Through Refrigerated Tunnel in Thin Layer on Moving Endless Metal Belt—Walter R. Maguire, Manhasset, N. Y. No. 2,282,525. May 12, 1942.

Bottled Beverages Packaged in Container Carton Designed to Serve as Six-bottle Carrier—Charles P. Swan, Decatur, and Frederick W. Dickson, Atlanta, Ga. to The Coca-Cola Co., Wilmington, Del. No. 2,282,619. May 12, 1942.

Packaged Fruit Juices Refreshed by Removal of Undesirable Gases and Vapors Followed by Aerating and Addition of Freshly Expressed Juice—Homer Reid Torrence, deceased, by Robert C. Mize, administrator, Santa Ana, Calif., to Gladys J. Torrence. Nos. 2,282,622 and 2,282,623. May 12, 1942.

Corn Sliced, Shredded and Scraped From Cob on Small Operation Scale by Manual Means—James B. Lee, Dallas, Tex. No. 2,282,660. May 12, 1942.

Ice Cream Cones Dipped in Quantity by Manually Operated Mechanical Means—James A. Lewis, San Diego, Calif., to Arden Farms Co., No. 2,282,661. May 12, 1942.

Frozen Confections Produced in Continuous Manner by Spraying Liquid Mix Against Wall of Refrigerated Chamber While Continuously Removing Frozen Material From Wall—Ernest E. Lindsey, Los Angeles, Calif., to Insta-Freeze Corp. No. 2,282,662. May 12, 1942.

Olive Oil Stabilized Against Oxidative Deterioration by Curing Olives Thoroughly With Common Salt Prior to Expression of Oil—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,282,779. May 12, 1942.

Olive Oil Stabilized and Given Unusual Taste and Odor While Being Expressed From Thoroughly Salted and Dehydrated Olives by Mixing Small Quantity With blend of Glyceride Oil and Refined White Mineral Oil—Sidney Musher to Musher Foundation, Inc., New York, N. Y. No. 2,282,780. May 12, 1942.

Imitation Olive Oil Given Improved Properties by Treating Olive-infused Glyceride and

Refined White Mineral Oil Mixture With Small Amount of Removable Ground Drupe—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,282,781. May 12, 1942.

Olive Flavor in Olive Infused and Olive Oil Blended Glyceride and Refined White Mineral Oil Treated With Small Amount of Benzaldehyde—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,282,782. May 12, 1942.

Canadian Patents

Autoxidizable Fats or Their Acids Stabilized by Adding Low-molecular Gallate Ester—Theodor Sebalitschka, Berlin, Germany, and Erich Bohn, Cardiff, Wales, to Nipa Laboratories, Ltd., London, England. No. 403,714. March 24, 1942.

Beverage Cans Lined With Preparation of Deodorized and Steam-treated Petroleum Wax—Geo. D. Beal, Pittsburgh, Pa., to Continental Can Co., Inc., New York, N. Y. No. 403,787. March 31, 1942.

Beverages Mixed in Bottles by Rotation of Cylinder to Which the Bottles Are Attached—John R. Adcock, Pikesville, Ky. No. 404,017. April 14, 1942.

Oats Hulled by Impact in Centrifugal Machine After Being Swelled With Water and Superficially Dried in Centrifuge—Per E. Hamring, to Kvarnaktiebolaget Tre Kronor, Stockholm, Sweden. No. 404,111. April 14, 1942.

Refrigerating Equipment

(*Continued from page 59*)

sufficient flooding also restricts maximum output. However, either of these extremes is easily avoidable by means of readily available controls that assure best operating conditions. Even slight piping changes will often bring about greatly improved results.

One of the commonest causes of loss in plant capacity is unsealed, or only partly sealed, receivers. Gaseous refrigerant blowing through a receiver is wasted compressor output and wasted power input, but can be observed in many plants. In such cases, if adequate receiver capacity is not available under all conditions, the "high side" trap, or float, is an inexpensive and simple correction.

Most modern refrigerating plants are fairly liberal users of automatic controls that assure good operation. Such devices have reached a high state of development and reliability, and are moderate in cost. They are as applicable to old, slow speed equipment as to modern high speed machinery. However, useful as these devices are as aids to economical operation, they are not a cure for wrongly or poorly designed installations. They can relieve some of the troubles in these systems, but cannot make a wrong thing right. Also, these devices require sufficient attendance to assure their proper performance, which is a point, too often forgotten.

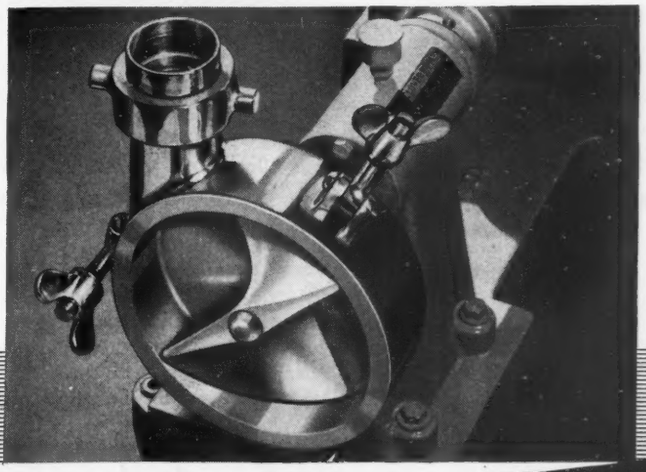
Check These Points

Some of the things to look for that indicate refrigerating plant difficulties and tell when the equipment is not developing its potential capacity are:

1. A temperature corresponding to suction pressure that is more than 15 or 20 deg. F. below the room temperature that is carried.
2. A temperature corresponding to suction pressure that is more than 10 deg. F. below the temperature of the brine or other liquid being cooled.
3. A comparatively warm suction gas temperature at the compressor when ammonia is the refrigerant.
4. A comparatively cold suction gas temperature at the compressor when Freon or methyl chloride is the refrigerant.
5. Warm compressor suction valves, indicating valve leakage.
6. Cold compressor discharge valves, indicating valve leakage.
7. Cylinder barrels that are too warm, indicating piston leakage.
8. Cold discharge lines.
9. Condenser pressures corresponding to temperatures in excess of 10 deg. F. above the temperature of water leaving the condenser.
10. Condensed liquid discharge temperatures 5 to 10 deg. F. colder than corresponding condenser temperatures.
11. Height of liquid above receiver outlet less than four times the diameter of the liquid outlet pipe.
12. Brine density freezing temperatures close to the corresponding suction temperatures.
13. Excessive frosting of room cooling or blower unit coils.
14. Cold or frosted safety valves.
15. Inadequate refrigerant charges.
16. Excessive pressure drops in pipelines.

This list does not cover all the possible shortcomings of a refrigerating plant, but it will go a long way in pointing out troubles that often exist. Other difficulties can be determined by an examination of power, water, refrigerant and lubricating costs over some period of time.

If maintenance has been neglected or postponed, it will be reflected in the items in the list just given. The refrigerating system will probably be found to be charged with excess lubricant. If an excess of lubricant appears to be unavoidable in the operation of a Freon or methyl chloride system, it indicates that an oil separator of adequate size is needed in the discharge line. Heat exchangers, between the condensed liquid and suction return vapors, will improve the cyclic efficiency and capacity for Freon and methyl chloride machines, but not for ammonia systems. Since these refrigerants, particularly Freon, have great metal cleansing ability, they will release scale and dirt not thought existant. The release of these undesirable elements will often cause trouble if they are not trapped out by a strainer placed close to the compressor. Should material lodge in the suction line or plug up the strainer, the refrigerating plant will perform as if of insufficient size.



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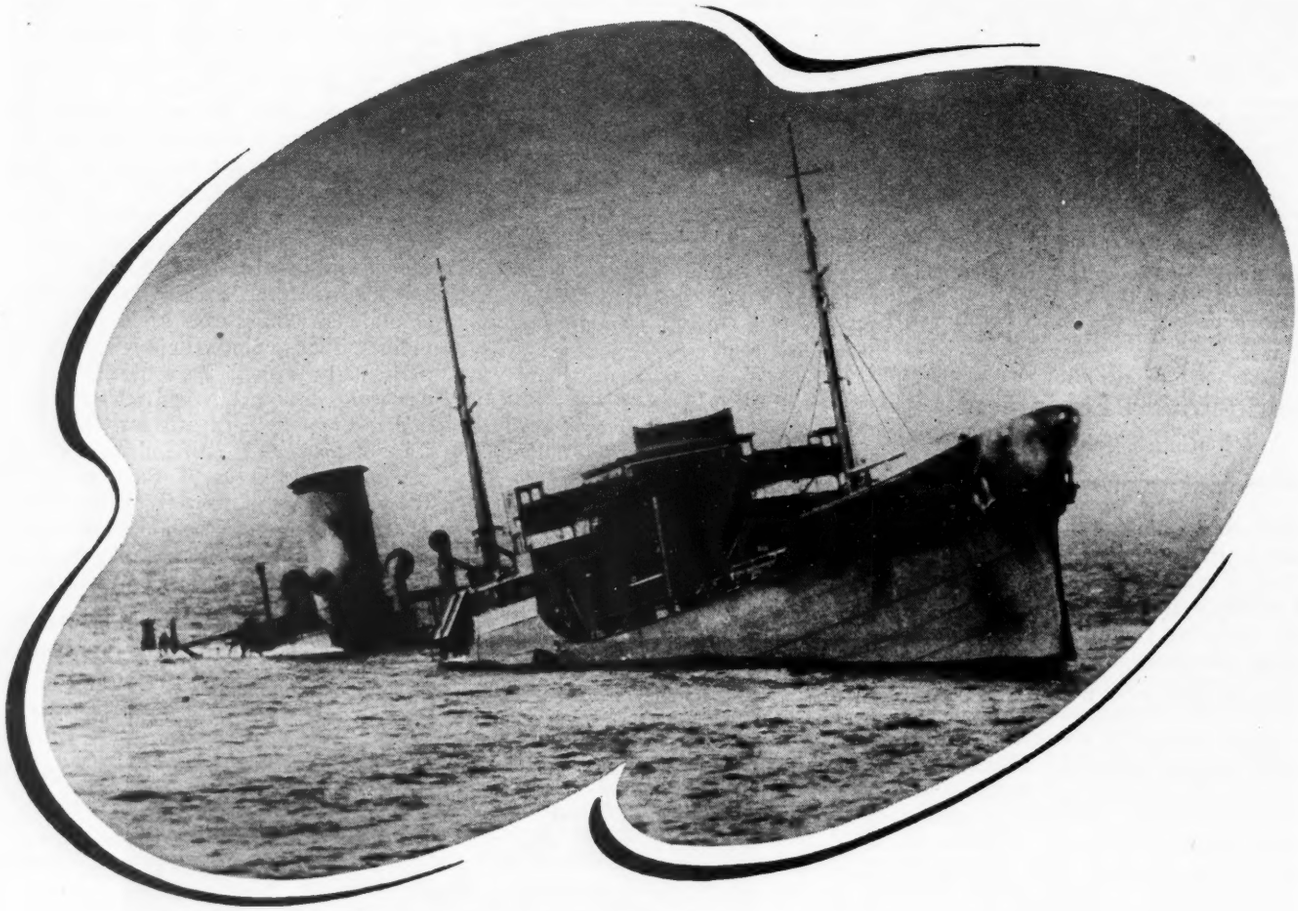
VITAMINS GROW MORE IMPORTANT



SHIPS go down—tires blow out—freight trains are delayed. Every day the problem of transporting the tremendous quantities of food needed for 200,000,000 people engaged in total war becomes more acute!

But, this food must go through to the fighting forces all over the world, as well as to the home front. To get it through and at the same time safeguard against the vitamin deficiencies encountered even before the war, each cubic foot of space must carry new high vitamin values to help win the war.

The quickest, most direct and cheapest way to increase vitamin content with a minute increase in weight and bulk is through the addition of pure vitamin substances—thiamine (vitamin B_1), niacin and ascorbic acid (vitamin C). For example, to add the full daily vitamin B_1 requirement of 15,750 active adults takes but a single ounce of thiamine! To help solve your enrichment problems, come to the company which manufactures synthetic vitamins by the tons. Our Research Department stands ready and eager to help you.

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

BEVERAGES

Foaming in Wines

WINES, unlike beer, should not be foamy. Frothing occurs especially in sparkling wines and in young unfortified wines during such operations as racking and filtering. It is also encountered in continuous and pot stills. Red wines resist foaming much better than pink wines from the same grapes, not fermented on the skins, but this superiority is apparently not a result of higher tannin content in red wines. Fermentation tests at 32, 55, 72 and 91 deg. F. showed the greatest foaming tendency in wines fermented at 72 deg. The Burgundy, Champagne and Jerez 35A strains of *Saccharomyces ellipsoideus* revealed no marked difference in foaminess of fermented musts, whether in presence or absence of added sulphur dioxide. Ethyl and amyl alcohols lessen foam stability, but the amounts required to produce a significant result are larger than would be encountered in practice. Saponins are apparently not a factor. Tannic acid diminishes foaminess in warm wines but is not effective in the cold, and even tends to increase frothing. The frothing effect of gas bubbles is the same whether the gas is air or carbon dioxide.

Digest from "Foaming Properties of Wine: Method and Preliminary Results," by Maynard A. Amerine, Louis P. Martini and Wm. De Mattei, *Industrial and Engineering Chemistry*, vol. 34, 152, 1942.

MEATS

Protective Coating For Meats

ACCORDING to this invention, animal products can be supplied with a jelly-like protective coating which will not support mold growth, which is impervious to air, and which is toxic to bacteria. The coating material does not in any way impair the meat for human consumption.

The coating can be sprayed on or formed on the product by dipping in a suitable bath. It consists of water; an acid such as lactic, tartaric, citric or malic; a metallic pectinate, preferably of nickel or cobalt; and sugar or a polyhydroxy alcohol such as glycerine. The metallic pectinate should contain 0.2 to 1.0 per cent of nickel or cobalt in the pectin. Such pectinates are harmless if taken internally, due to their colloidal character and stability. The coated meat can be chilled or frozen and held at a reduced temperature without loss of weight by dehydration. The coating can be further protected from mechanical injury by an outer covering of paper or cloth.

Digest from U. S. Patent 2,245,576, granted to Arnold C. Dickinson, Lunenburg, Mass., and Philip Bliss Myers, of Scarsdale, N. Y., June 17, 1941.

DAIRY PRODUCTS

Quality Standards And Production Methods

STANDARDS of food quality are not always appropriate to the latest and best production methods. As an example, the plate count as a criterion of bacteriological quality has serious drawbacks. In meeting the required limits, dairies have had to process milk to a point which impairs its palatability and lessens consumer acceptance. The tendency to insist on *quantitative* standards of food quality should be checked by establishing *qualitative* standards when they would serve the purpose of protecting consumers. Even lard might be considered a flavor rival of the milk that will be marketed if milk sanitarians continue the present trend toward stringent standards.

To make milk capable of keeping longer than consumers need to keep it is no service to economy. To make it unpalatably super-safe is no service to public health when public health calls for high milk consumption as one of the nutritional needs. More reason and less rule is the present need in establishing and applying quality standards.

Digest from "Are Trends in Quality Standards Consistent With Modern Production Practices?" by M. E. Parker, *Proceedings of the Institute of Food Technologists*, 1941, 138.

Keeping Whole-milk Powder

WHOLE-MILK powder develops a tallowy flavor on storage, due to oxidation, which has limited its usefulness. Experimental lots of vacuum-roller-dried powder were made from clarified, standardized (4 percent), pasteurized and homogenized milk, with and without the addition of copper sulphate. Antioxidants added to the milk varied in their power to slow up the appearance of tallowy flavor. Five parts per million of gum guiac or 10 parts per million of hydroquinone (the latter patented but possibly toxic) were most effective. Ascorbic acid (one hundredth of one percent) or sodium citrate (one-fifth of one percent) were moderately effective. Tyrosine butyl ester, "Avenex," "Enzylac," and a *S. lactis* culture were of least service. High moistures in the powder (over 5 percent) and warm storage (over 70 deg. F.) favored tallowiness. Pasteurizing for 30 minutes at 170 deg. was better than at 150 or 190 deg. For containers airtightness is desirable; tin cans should be lacquered; "Avenex"-coated paper bags helped prevent off-flavor.

Digest from "The Relation of the Use of Certain Antioxidants and Methods of Processing to the Keeping Quality of Powdered Whole Milk," by H. A. Hollender and P. H. Tracy, *Journal of Dairy Science*, vol. 25, 249-274, March, 1942.

FROZEN FOODS

Railroad Storage For Quick Frozen Foods

DURING transportation and distribution, quick frozen products must be held in the temperature range between zero and minus 5 deg. F. This requires precautions beyond maintaining the storage space within the desired range. Warehouses may be of the same type of construction as for general cold storage, with insulation increased to insure constant temperatures of minus 5 to minus 10 deg. F. for storage and minus 30 deg. F. for freezing rooms. Where the volume justifies it, there should be a receiving room, two or more storage rooms and a work room. Large rooms, 50x100 ft., seem proper for bulk storage, but smaller rooms, about 25x50 ft., should be provided for quick-moving stock. Super-insulated refrigerator cars are used, generally cooled with 70 percent ice and 30 percent salt.

Speed in loading and unloading is essential. The car should be cooled to zero or lower before loading, the distance between storage rooms and car

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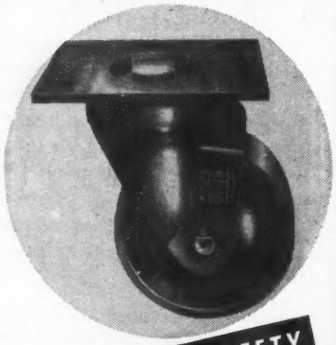
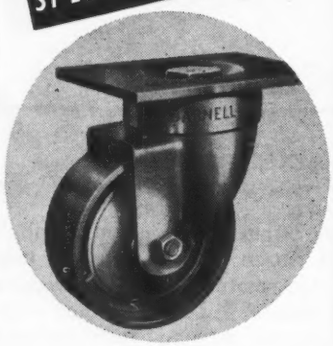


SPEED with SAFETY



FREE
MANUAL

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LONG BEACH, CALIFORNIA
36 N. CLINTON ST., CHICAGO
60 WALKER ST., NEW YORK CITY

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should be reduced to a minimum, and an insulated enclosed runway should be provided, large enough to allow for operation of the doors in both car and building.

The same considerations apply to local distribution by truck.

Less-than-car-lot shipment is in the development stage. Portable refrigerated containers cooled with dry ice are in use for transportation of quick frozen foods over short routes.

Digest from "Railroad Storage Requirements for Quick-Frozen Foods," *Railway Age*, vol. 112, 862-4, May, 1942; report presented at the convention of the American Railway Engineering Association, by a subcommittee of the Committee on Buildings.

VITAMINS

Vitamin-enriched Bread

THE trend toward fortification of white bread with vitamins has directed attention to brewers' yeast as a source of the vitamin B complex. It is rich in the B vitamins and is available in quantity. Laboratory tests on nutritional value and palatability indicate that white bread could be adequately fortified in vitamin potency without any disturbance to established habits and preferences among consumers. Dried debitterized brewers' yeast was used in the amounts of 2.5, 5 and 7.5 percent (calculated on bread solids). The 2.5 percent yeast bread was as good in quality as the control and considerably richer in B vitamins. The 5 and 7.5 percent yeast breads showed that too much added yeast is unfavorable to quality. Brewers' yeast deserves careful consideration as a potential material for vitamin enrichment of white bread.

Digest from "Enrichment of White Bread With Vitamin B Complex," by Robert Schwarz, Stephen Laufer, Louis Laufer and Mortimer W. Brenner, *Industrial and Engineering Chemistry*, vol. 34, 480, 1942.

FLAVOR

New Developments In Flavor

VANILLA substitutes, brought into the market to meet the shortage of imported vanilla, tend to rely too much on coumarin, but some makers are reproducing more accurately the true vanilla flavor. Propyleneglycol, being tax-free and less toxic than ethyl alcohol, is potentially an important solvent for making flavoring extracts. A recent improvement in making true fruit flavors involves continuous quick freezing of the juice, extraction with alcohol and blending of the extract (or its distillate) with the juice concentrate.

Essential-oil supplies are under serious interferences from lack of shipping for imported products, and for domestic products from diversion of labor into the armed forces or war-industry jobs. Probably the efforts now being made by State experiment stations and private interests to encourage cultivation of herbs for flavoring will introduce several new crops to postwar American agriculture.

Sage, marjoram, coriander, fennel, dill, thyme, tarragon, paprika and other plants are being cultivated, some to increase domestic production of familiar plants and others to replace importations. Sodium glutamate, a meat flavor long popular in Japan and China, is now being produced in quantity in America for flavoring soups and other dishes. Zein is used in making glutamates. In comparative tests of sweetening power, sucrose still ranks first on a cost and performance basis at low sugar concentrations, but corn sugar or sirup serves excellently in heavy sirups such as are used in canning certain fruits.

Digest from "New Developments in Flavor," by Bernard H. Smith, *Proceedings of the Institute of Food Technologists*," 1941, p. 192.

SUGAR

Beet Sugar Materials

THE HIGH-SPEED crystallizers which are now being adopted for crystallizing low raw, beet sugar fillmass must be controlled if they are to perform at their best.

As a basis for control, data are needed on rates of crystallization from sugar solutions at different supersaturations and at various temperatures. Since rates of crystallization are highly sensitive to impurities and physical conditions, the needed information cannot be derived from data on pure sucrose solutions. Determinations have therefore been made with a typical fillmass in the green sirup (mother liquor) purity range actually occurring in the crystallizers.

The experimental results show that supersaturation passes through an optimum at 1.5 which is rather critical for operating efficiency. This optimum occurs in the lower temperature range (up to 50 or 60 deg. C.) of crystallizer operation, and it was found that temperature could be advantageously dropped as low as 32 deg. C. A time temperature curve can be plotted for a given fillmass which holds the supersaturation of the green sirup at the desired level.

Digest from "Low-Purity Beet Sugar Factory Materials: Rates of Crystallization in Crystallizer Fillmass," by R. A. McGinnis, Somers Moore, Jr., and P. W. Alston, *Industrial and Engineering Chemistry*, vol. 34, 171, 1942.

FATS & OILS

Vegetable Oils

PRESS efficiency and oil yield from oil seeds can be calculated accurately enough for practical purposes from an equation which has been developed from experimental data. Soybean, cottonseed, rapeseed, peanut, sesame, tung and castor oils were included in the experiments. The principal factors influencing oil yield are pressure, temperature, pressing time and moisture content of the seed. The tests were made with a laboratory hydraulic press capable of exerting pressures up to 5,000 lb. per square inch. Temperature variations were obtained with the aid of electric hot plates.

The influence of moisture content is such that for each kind of oil seed there is an optimum moisture level corresponding to maximum oil yield. At ordinary temperatures the optimum moisture content is 5 to 8 percent for sesame, 6 to 8 percent for peanut, 8 to 12 percent for rapeseed and 6 to 11 percent for cottonseed meal. For each kind of seed there is a press constant which does not depend on the moisture or oil content. Press efficiency is the ratio of oil yield to oil content, calculated either on the dry basis or from observed values without correcting for moisture content.

Digest from "Expression of Vegetable Oils: A General Equation on Oil Expression," by Eugene C. Koo, *Industrial and Engineering Chemistry*, Vol. 34, 342, 1942.

MISCELLANEOUS

Activated Carbon As a Byproduct

ACTIVATED CARBON can be produced from oat hulls, pecan shells, rice hulls, corncobs and other waste materials. The carbons thus produced compare favorably with commercial active carbons in their power to remove objectionable odors and tastes, as indicated by tests with potable waters. Pecan-shell carbon is especially active, but oat-hulls and corncob carbons also have relatively high activity. In deodorization tests, pecan-shell carbon ranked above two commercial carbons which were tested for comparison. The dose of active carbon was slightly more than one grain per gallon, in water strongly scented with aldol. A cost calculation indicates that with pecan shells worth $2.25 per ton delivered and with distillation cost covered by the value of volatile products, pecan-shell carbon could be produced, activated and marketed for about $40 per ton, the yield of primary charcoal being 27 percent

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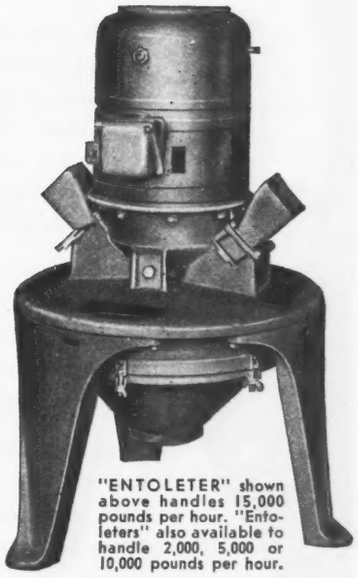
installed in your production line will MECHANICALLY destroy insect life in all stages, egg, larva, pupa, and adult.



"ENTOLETER" shown above handles 15,000 pounds per hour. "Entoleters" also available to handle 2,000, 5,000 or 10,000 pounds per hour.

Inexpensive

Easy to Install and Operate

Minimum Maintenance

ENTOLETE *your flour*

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Refrigeration

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We've been preserving perishables, protecting beverages in process and in storage in a large number of plants for a long time. Back of the refrigeration equipment in these plants is a record of operating efficiency that is standing these Vilter owners in good stead now!

But — Today, Vilter's experience, engineering knowledge, and equipment is going to critical places necessary to keep our war plant producing. Today, we are concentrating on doing first jobs first.

Some day this war will be over. When it is we will be in a better position than ever to serve you better. In the meantime, help swing the battle to Victory.

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and the activation loss 50 percent.

Digest from "Activated Carbon From Certain Agricultural Wastes," by T. R. McElhinney, B. M. Becker and P. B. Jacobs, *Iowa State College Journal of Science*, vol. 16, 227, 1942.

Warding Off Insect Pests

Among the 30 or more varieties of insects infesting food products, the grain weevils, meal moths, Dermestidae (infesting meats and spices), and mites which attack cheese, dried meats and dried fruits are prominent. Some of the operations of modern food processing, such as bolting flour, cooking, baking, grinding and the like, help to keep down infestation. But active offense is still the best defense and destruction of insect pests before they reach the processing plant is essential. Heat or cold will kill insects but these treatments are not effective for a large bulk of material because heat transfer between the interior and the exterior is too slow. Fumigants such as hydrogen cyanide, ethylene dichloride, carbon tetrachloride and ethylene oxide are therefore needed. In cyanide fumigation the effective dose can often be materially lessened by piping the gas directly to the areas of heaviest infestation. The building must still be sealed, but the lethal concentration of fumigant need not be reached throughout all its space.

Digest from "Prevention of Insect Infestation of Foods," by W. C. O'Kane, *Proceedings of the Institute of Food Technologists*, 1941, p. 69.

Preserving Eggs

Urea and dimethylolurea are effective mold inhibitors. So are the vapors of certain solid fungicides such as polychlorophenates. For preservation during unrefrigerated storage or overseas shipment a sealing treatment is needed to supplement the initial disinfection. Trials of 21 methods showed the best procedure to be conditioning with carbon dioxide to lower the pH, surface treatment with a disinfectant (preferably dimethylolurea) and sealing with vaseline. The sealing agent must be effective against growth of any surviving organisms as well as against recontamination. Polyvinyl alcohol is another satisfactory sealing agent. Packing oil-dipped eggs in moistureproof bags gives acceptable protection from spoilage during overseas shipment.

Digest from "Preservation of Eggs: I. Treatments for Maintaining Quality in Shell Eggs at Ordinary Temperatures," by F. T. Rosser, W. H. White, A. H. Woodcock and D. A. Fletcher, *Canadian Journal of Research*, 20D, 58, 1942 (Published in Canada).

Precision Instruments Speed Quality Control

(*Continued from page 63*)

instrument. However, a little experience and the averaging of several readings on each sample will give sufficient accuracy.

Another factor which must be considered in the use of refractive index as a measure of maturity is the changes which take place in corn when held for any length of time after harvesting. The refractometer measures the amount of water-soluble solids in the kernel fluids. A large part of these water-soluble solids is sugars and dextrins, and Appleman [2] has shown the rapidity with which changes may take place in these carbohydrates when the corn is held for any length of time after harvesting. Since change in the concentration of the water-soluble solids will be reflected by a change in refractive index, the value of refractive index as a measure of maturity will decrease the longer the corn is held after harvesting. To get best results, the refractive-index test should be run as promptly after harvesting as operating conditions will permit.

Brown-Duvel Apparatus

The determination of moisture by means of the Brown-Duvel apparatus showed lower correlation with the numerical scores than either the semi-automatic moisture tester, "yardman's grade" or refractive index. The maximum error of estimate shown in Fig. 2, however, was no greater than that obtained with refractive index.

In general, the determination of moisture by this method was less desirable than by means of the semi-automatic process. The results were somewhat less accurate, the procedure was somewhat more involved, the determination was slow and required the constant attention of the operator.

Gravity Separation

The gravity-separation test gave lower correlation with numerical score than did the semi-automatic moisture tester, "yardman's grade," refractive index and Brown-Duvel moisture determination. Fig. 2 shows that a maximum error of estimate of from 2.0 to 2.4 numerical grades was obtained. The procedure, as used in this investigation, was considered to be too slow and inaccurate for use in estimating maturity.

Conclusions

In summing up the results of these studies the following conclusions are reached:

a. The thumbnail test when applied by an experienced, skilled judge gives a good estimate of maturity. But, its success depends much upon the human factor as compared with laboratory determination.

b. The refractive-index method is comparatively accurate and very rapid. Natural change taking place in the corn when held for varying periods of time may influence the value of the test unless applied to corn freshly harvested.

c. The moisture testing method is favorably regarded because its technic is simple, its equipment cost is not excessive and its use does not involve a long-experienced operator. Through the use of a semi-automatic instrument the moisture-test determinations are speeded up, are easy to make and are accurate.

References

[1] L. F. Pratt, Moisture Content as an Indication of Maturity in Sweet Corn, *The Canner*, Feb. 25, 1939, p. 80.

[2] C. O. Appleman, Carbohydrate Metabolism in Green Sweet Corn during Storage at Different Temperatures, *Journal of Agricultural Research*, vol. 17, pp. 137-152.

Why Not Convert the Apple Jack Plants?

(*Continued from page 45*)

starch to dextrine (or dextrose), for settling out solids before filtration, and so forth. There is not likely to be a surplus of wooden tanks in the distillery that cannot be utilized in the pectin-cider condensing plant. However, there is almost sure to be a surplus of copper tanks used for storing and measuring brandy in its various stages of manufacture. With the present shortage of copper, this unused copper should be made available to key industries. The same applies to unneeded dephlegmators, scrubbers, rectifying columns and what not. Much of this equipment could be used in food or chemical plants without change.

In planning to convert one type of plant to another and having to depend almost entirely on utilizing the available equipment, one must be prepared for bottlenecks. From floor space to boilers, motors, pumps and processing equipment, the new product will require different capacity and often a different type of equipment from that used for the manufacture of the original product. But in the case of apple brandy, boiled cider and pectin extract, not only is the equipment similar but the raw material, apples, is identical.

Steam Is Available

Plants converted from distilling to evaporation are generally in balance for steam requirements. The boiler room is the heart of distilling, condensing and drying plants. Unless additional steam-generating equipment is obtainable or steam can be purchased from a utility, the boiler horsepower available will establish the maximum plant capacity. To be sure, efficient use of steam and equipment so as to take advantage of heat wasted in the exhausts from power and cooking units can do much to utilize boilers to the best advantage, but one must always keep in mind that 971 B.t.u. is required to evaporate 1 lb. of water into steam at 212 deg. F. In providing for boilers to evaporate cider to 68 percent solids, a boiler horsepower should condense 5 gal. of cider into 1 gal. of concentrate per hour. This, of course, is a guide only. It depends upon whether the steam available is needed only for evaporation of cider or must be used in part for power.

As the concentration of cider is carried on in small plants, such equipment as multi-effect evaporators is not considered in this calculation of steam requirements. In this conversion plan, only single-effect evaporators, vacuum pans, or continuous concentrating "boxes" or steam coils in cooking tanks are being considered.

In distilling apple brandy it is necessary to turn an approximate 5 percent alcohol solution of cider into 50 percent (100-proof) brandy. And this requires steam not only to evaporate the alcohol from 5 gal. of cider to make 1 gal. of alcohol but steam to redistill the first distillation. The 5 to 1 ratio holds for both the condensing of sweet cider to 68 percent solids and for distilling "hard" cider into brandy. Happily, in converting a distillery to a concentration plant the steam requirements are very nearly the same per gallon of finished product. In one case the residue is the primary product, in the other, the distillate.

Have You An Idea On Conservation?

B. T. Branham's article on how apple brandy plants can be converted to the manufacture of needed products may suggest to you other plant conversions. If it does write up your idea and send it to FOOD INDUSTRIES.

The conversion might be from non-essential foods to those needed for the war effort. Or it might involve changing a food plant, or part of it, over to the manufacture of direct materials of war. —THE EDITORS.

DRIVE STRAIGHT TO MORE SALES with FOOD ENRICHMENT

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Do it by adding "CRYSTALLINE B_1 WINTHROP", crystalline thiamine hydrochloride, U. S. P. — or "CRYSTALLINE VITAMIN C", ascorbic acid — giving your product the increased value of these approved synthetic nutrients—or make the recommended enrichment of your bread easy, accurate and economical by using "B-E-T-S"—tablets combining vitamin B_1, niacin and iron in approved proportions.

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FORMULAS FOR FOODS

FORMULA NO. 323

Buttermilk Bread

(Straight Dough)

Bread flour	12 lb. 4 oz.
Liquid buttermilk (variable)	1 gal.
Yeast	4 oz.
Mineral yeast food	½ oz.
Malt	1 oz.
Salt	4½ oz.
Brown sugar	8 oz.
Shortening	8 oz.

Mixing Directions

Dissolve the yeast in part of the buttermilk. Dissolve the other ingredients except shortening in mixer with balance of milk. Then add the flour. When partially mixed, add the yeast solution. Follow with the shortening and mix dough until smooth. Dough temperature should be 80 deg. F. Approximate time for first rising 1¾ hours; to bench or divider, 15 minutes.

Scale or divide, round up and allow 15 to 20 minutes recovery before molding. Make up into plain round top or twin-style breads. Give medium proof and bake with light steam. Bake approximately 30 minutes at 440 deg. F. The quantities given in this formula will make 20 1-lb. loaves.

Formula from General Mills, Inc.

FORMULA NO. 324

Lacto-Loaf

Boneless chucks	60 lb.
Lean pork trimmings	20 lb.
Regular pork	10 lb.
Smoked skinned jowls or bacon ends	10 lb.
Dry milk solids—not over 1½% fat	10 lb.
Salt	2½ lb.
Cure*	1 qt.
Pimentos No. 3 cans (chopped fine in their own juice to make a paste)	2 cans
Ground chili peppers	1½ lb.
Paprika	1 lb.
Nutmeg	2 oz.
Ground caraway	1 oz.
Ground celery	1 oz.
Garlic powder	½ oz.

* Cure consists of:

Sodium nitrate	2½ oz.
Sodium nitrite	¼ oz.
Dextrose	9 oz.
Water	8 lb.

Grind all meat through a 1-in. plate and place in mixer. Add salt, chili peppers, paprika, caraway, garlic, nutmeg and celery, and mix well. Start mixer and sprinkle cure, dry milk solids, mixed spices and pimento paste (in order named) over the meat. Add about 1 gal. of cold water while mixing. When materials are mixed, run all through a ⅛-in. plate.

Stuff into "Frank" or "Hoy" molds and cook at 165 deg. F. until inside temperature has reached 165 deg. F. Chill and remove from molds. Either wrap in suitable paper or stuff into cellulose casing.

Formula from American Dry Milk Institute, Inc.

FORMULA NO. 325

Scotch Cookies

Sugar	4 lb.
Shortening	2 lb.
Soda	2 oz.
Salt	1 oz.
Cinnamon	¼ oz.
Allspice	¼ oz.
Cloves	⅛ oz.
Eggs	1 pt.
Molasses	1 pt.
Milk	1½ pt.
Soy flour	10 oz.
Flour	5 lb. 6 oz.

Mixing Directions

Cream sugar, shortening, soda, salt and spices, then add eggs gradually, then molasses and milk. Sieve flour and soy flour together and add to the mix. Roll about ⅛ in. thick on the bench and cut with 2½ in. cutter. Place 24 in a bun pan, wash with egg wash (not too rich), and bake at 325 deg. F.

Formula from A. E. Staley Mfg. Co.

FORMULA NO. 326

Yellow Layer Cake —Low Sugar

Fine granulated sugar	5 lb.
Shortening (emulsified type)	2 lb. 8 oz.
Salt	2 oz.
Liquid milk	3 lb. 8 oz.
Vanilla extract	2 oz.
Cake flour	5 lb.
Baking powder	5 oz.
Cream of tartar	1 oz.
Whole eggs	2 lb. 8 oz.
Liquid milk	2 lb.

Mixing Directions

Place the sugar, shortening and salt in the machine bowl, and cream together until medium light, or for about 5 minutes on second speed. Dissolve the vanilla in the milk. Add and mix on low speed just enough to break up the mixture. Sift together the cake flour, baking powder and cream of tartar, add to the machine bowl and mix until smooth, or for about 2 minutes on low speed. Mix together the eggs and milk. Stream these slowly in during a 3-minute mixing period on low speed. Scrape down sides and bottom of bowl and finish batter by mixing about 2 minutes more on second speed.

Have temperature of finished batter between 65 and 70 deg. F. Scale 12 oz. to an 8x1½-in. pan. Grease pans with a compound of one part cake flour and two parts shortening. Bake 18 to 20 minutes at 375 to 385 deg. F. Do not overbake.

Formula from General Foods Sales Co., Inc.

FORMULA NO. 327

Ice Box Cookies

Sugar (granulated)	1 lb.
Shortening	1 lb. 8 oz.
Butter	8 oz.
Cake flour	3 lb.
Egg whites	4 oz.
Flavor	¼ oz.

Mixing Directions

Cream sugar, shortening and butter, add egg whites, flavor and flour. Roll into round bar of about 1 in. diameter and 24 in. length. Place in refrigerator until firm. Cut with sharp knife into disks about ¼ in. thick. Put on lightly greased pans and bake at 375 deg. F.

Formula from Institute of American Poultry Industries.

FORMULA NO. 328

Prepared Doughnut Glace

Sugar, confectioner's	100 lb.
16 concentrate pure or imitation vanilla	1 oz.
Algin	1 oz.
Powdered gum karaya	1 oz.
Gelatine (fine powdered)	8 oz.
Tapioca flour	3 lb.

Mixing Directions

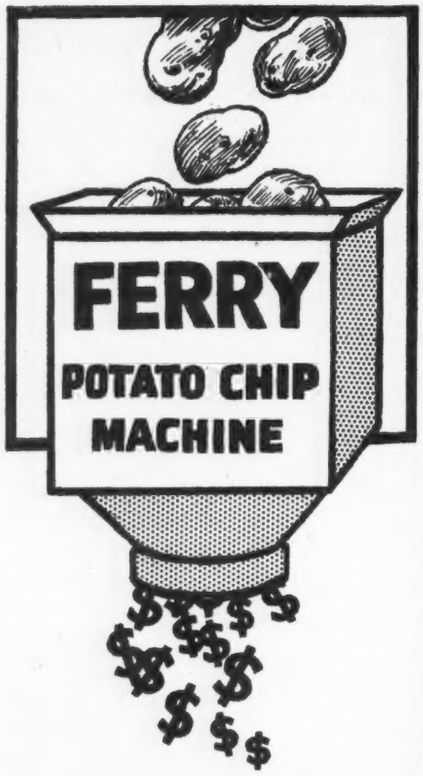
Mix ingredients together (add vanilla mixed with part of the sugar). Add boiling water to produce consistency and stiffness required to coat doughnuts. Keep over hot water bath while using.

Formula from Parker-Broeg.

FORMULA NO. 329

Spicy Date Paste

Pitted dates	54 lb.
Cinnamon	4 oz.
Ginger	1½ oz.
Salt	2⅔ oz.
Cold water	36 lb.
Honey	9 lb. 8 oz.



It's not quite that simple . . . but you get the idea

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Mixing Directions

Chop dates in coarse pieces—halves or thirds. Add spice, salt and water. Heat quickly to boiling and boil for two minutes. Add the honey to the hot mixture, stirring it in well. Turn paste out to cool.

This is excellent for filled cookies.

Formula from "Bakers Cake Better than the Housewife Can Bake," reprinted by permission of Brown's Hungarian Corp.

FORMULA NO. 330

Butter-Muffin Base

Sugar	30 lb.
Salt	10 oz.
Concentrated butter flavor	¼ oz.
Hydrogenated shortening	11 lb. 4 oz.
Butter (or shortening)	1 lb. 4 oz.
Milk powder	5 lb.
Soda	15 oz.
Baking cream (phosphate)	1 lb. 14 oz.
Cake flour	25 lb.
Bread flour	25 lb.

Mixing Directions

Mix salt, sugar, butter flavor, shortening and butter together. Then add the sifted milk powder, soda, baking cream and cake flour. Add bread flour last. Put aside to use. For longer shelf life replace all the butter with hydrogenated shortening.

Formula from Parker-Broeg.

FORMULA NO. 331

Blueberry Muffins

Whole eggs	8 oz.
Milk (variable)	14 oz.
Basic muffin mixture (Formula 330)	2 lb. 8 oz.
Blueberries	1 lb. 6 oz.

Mixing Directions

Place the whole eggs and milk in the machine bowl and then add the basic muffin mixture. Mix one minute on low speed, scrape down and beat one minute on high speed. Add very carefully one pound of blueberries and mix by hand only enough to incorporate. Drop into well-buttered small muffin tins, 1 lb. to 1 lb. 2 oz. to the dozen. Then sprinkle 6 oz. of blueberries on top. Bake at 400 deg. F.

Formula from Parker-Broeg.

Changes in Formulas 90 and 98

Recent work by the Dry Milk Institute has shown that Summer Sausage, Formula No. 90, and Salami Cotto, Formula No. 98, published in July, 1940, should have ice water and dry milk solids both increased from 3½ to 8 lb., the formulas otherwise remaining the same.

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